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Advertising Electric Vehicles

NEWSPAPER publicity on behalf of the electric passenger vehicle has often been couched in the phraseology of the boudoir instead of being devoted to red-blooded explanations of the good points of this means of locomotion from a practical standpoint. Without wishing to deprecate these tastefully worded appeals to the typical "Milady" of the fashion papers, it is none the less refreshing to find in the advertisement of an eastern dealer in pleasure cars a new viewpoint tying this equipment into the great electrical movement of the day. In this instance, the author of the "copy" asked the reader to consider the wide utility of electrical energy; to observe what it is daily doing to increase his or her own comfort and convenience; and then to realize why constantly increasing numbers of motorists are now "Doing It Electrically" in the highly efficient and thoroughly modern product of the advertiser's factory. "Think," read the advertisement in part, "of the many manners in which electricity is successfully serving man; note how it lessens and lightens long labor and how rapidly it is supplanting all other kinds of power." Finally attention was called to the fact that the 1917 models of the dealer's "master motor car" are now on exhibition at his showrooms. The whole advertisement was keyed upon the statement that electricity is the greatest silent servant of man, and in drawing a parallel between the efficiency of electric power in general and as applied to automobile propulsion, the dealer broke away from hackneyed representations and accomplished a bit of display matter beneficial both to the electric vehicle and to electrical progress in general. More of this kind of work is needed.

The News Value of Power Contracts

ALTHOUGH the news value of central-station plant improvements has been emphasized in these columns more than once, the power contract as a text for judicious local publicity has received less attention. Yet when a manufacturer or retailer using power joins the roll of progressive purchasers of electric motor service, or when the central station itself makes arrangements with a large transmission network or other important company for the interchange of energy, the fact is capable of being made into the best kind of news for the local utility. We are sure that the opportunities in this field are not developed as they might be in many companies, for only occasionally does a thoroughly comprehensive power story of the highest class get into the news columns of any particular daily or weekly newspaper.

The days of special prices and rebates are happily passed in virtually all the communities served by central stations in the sense that prices are now open to public inspection and state regulation. It is hardly going beyond the facts to say that today one can count upon receiving practically one price for service under any one class of conditions, in all well managed central stations. This means that there is little or no reason for secrecy about the rates charged new power customers. Now when a local industry goes over to central-station service, the fact is interesting enough in most cases to justify at least a superficial story in the local papers giving the facts in a newsy way and incidentally advertising both the purchaser and the central station as progressive concerns. It may not be desirable to go into much detail about the volume of production in the factory buying power, or to set forth points about a private business which the owner of the latter would prefer to keep to himself; and yet there is real news in a statement as to the number of motors going in, possibly the connected load involved, the provision which is to be made for efficient handling through a local industrial substation, new tie line, underground service, or other detail, and perhaps a general statement that the company's regular schedule of rates for this class of service lies within this and that limit.

Not long ago a large central station secured a mill contract amounting to probably $50,000 a year in new business. This business was secured on the regular schedule of rates applicable to large users, and a copy of the contract was necessarily filed with the state commission in connection with the company's annual return of operations. This gave the basic kilowatt-hour charges and was good news for local dailies, even though the contract was made a public document by being filed with the state board. Nothing which could injure the customer appeared in the unit charges or in other details of the contract; his competitors could not figure his power costs in real money against their own, and yet the basic charges were of engineering interest and were also worth using in local publicity matter as evidence of the legitimacy of low rates for consumptions of large volume. Each manager must use his own judgment in handling such cases, but where the data are made public by the very act of filing them with the state authorities, there is certainly no justification

for secretiveness in any reasonable case where the publication of some of the data would interest business men, add to the reputation of the purchaser as a progressive house, and lend weight to the claims of the central station that its service is economically justified over a wider field than the public has hitherto realized.

When a mutual power contract is signed, it is not enough to point out in an interview in the local paper that the arrangement insures more reliable service to the public than formerly. That is good to bring out, but often the opportunity will be excellent to outline the saving in plant extensions or in reserve capacity which such a contract makes possible. It may be that such an arrangement will postpone additional heavy purchases of coal or oil at a time of high prices, or it may be that the hours of labor in the plant, the opportunities for overhauling and repairs, or the quality of service will undergo a change for the better. The inner significance and strategics of interchange contracts may well be made plain to the public when such deals are consummated, heading off any rumors of extortionate monopoly in their inception, and showing that by co-operation utilities as well as individuals can serve their customers and their times to better advantage in many instances than by trying to go the pace alone.

Compensation for Competitive Bidding

The analytical study of cost accounting carried on in recent years has brought about a strong tendency in many lines of business for more equitable systems of fixing prices or rates for commodities and services. The basic idea in this movement is that the various classes of customers of any industry should contribute proportionately to maintaining the industry, that is, no class should bear an excessive or unjust portion of the necessary costs of conducting the business in order that other classes may escape their proper share of this burden. This sensible reform has made greatest headway in the realm of public utilities, the rates of which are now almost universally based on an equitable apportionment of the costs of carrying on the business among the different classes of customers. In the opinion of many thoughtful business men, this scheme of just distribution of charges is bound to find much more general application in all lines of business, since it affords the only basis on which stability and all-around satisfaction can be developed.

In practically all branches of the contracting business there is urgent need of the early adoption of this principle of rational price-setting. Contracting in general suffers from about as many evils as any business is capable of withstanding. Most of these originate from abuses connected with the present methods of awarding contracts after competitive bidding. One of the principal difficulties of the present practice results from expecting contractors to make a gratuitous but careful study of the plans and specification submitted, which in many cases are incomplete, and on this base their estimate of a contract price which they are willing to bid and stand by if the contract is awarded to them.

To prepare such an estimate intelligently requires an expert knowledge of every detail of the business and it takes considerable time on the part of necessarily high-priced employees. If the contractor, in order to save on the expense of preparing the estimate, makes it hurriedly, he runs a great chance of losing very heavily in the execution of the contract. In any case, the cost of preparing the estimate and bid is now classed as one of the elements of general overhead expense which is distributed over the entire business. This element, however, is not only very large, but it can never be distributed equitably. A contractor may prepare estimates upon a dozen jobs without the assurance of receiving a contract on any of them.

These and other evils of the present system of competitive bidding were pointed out in an article by Mr. George W. Hill which appeared in the last issue. A second article on this timely subject by the same author appears in the present issue. In this Mr. Hill points out that this matter has been given a great deal of study by men connected with the building industry and of the solutions proposed none seems to be as comprehensive and as capable of immediate application as the one developed by Mr. H. W. Nelson, who has prepared what is known as "The Nelson Form for Choosing Bidders and Awarding Contracts." The full text of this form is printed in this issue.

Mr. Nelson's form is based on a detailed and logical analysis of the relations between buyer and seller in any merchandising proposition and particularly one involving so many difficult and elusive elements as enter in the three-cornered relations between the owner, architect and contractor in contracts in the building industry. He recognizes that the purchaser in such contracts is entitled to all the competition he may want, provided he is willing to pay for such competition, that is, compensate those entering the competition for their trouble and expense involved. Having recompensed the competitors, he is at liberty to award the contract to whomsoever he chooses. It is unnecessary to point out other important features in Mr. Nelson's form, which will be noted on reading it.

Careful study of it will convince contractors, and others interested in the building industry particularly, of the great care with which this form has been prepared and of the thorough consideration given to all elements involved. Although intended primarily for use in the building industry, it should prove of equal value to any line of contracting based on competitive bidding, such as contracting for public works in general and even in many other lines where carefully prepared estimates are necessary before contracts are awarded. It is to be hoped that electrical contractors, as well as the contracting fraternity in general, will give this form the most careful consideration and if it solves the chief difficulties involved, as it apparently does, it should be adopted either as it stands or with necessary revisions.

HAPPENINGS IN THE INDUSTRY

Power Sales Committee Meets in Chicago—Program for Illinois Contractors' Meeting—Annual Meeting of Western Society of Engineers—Pacific Coast Section Formed—New Dallas Franchises—Wisconsin Contractors' Report—Boston Edison Company's Position on Interior Wiring—Regenerative Braking Discussed

POWER SALES BUREAU, N. E. L. A., HOLDS IMPORTANT EXECUTIVE COMMITTEE MEETING.

Final Plans Made for Securing Comprehensive Data on Industrial Electric Power Applications.

An important meeting of the executive committee of the Power Sales Bureau of the Commercial Section, N. E. L. A., was held January 10, in Chicago, Chairman George H. Jones, of the Commonwealth Edison Company, presiding. Progress reports of the Bureau, which has comprehensive plans for securing data on power installations, were presented and final plans discussed and prepared.

The field of power and commercial engineering is covered by the four divisions of the Bureau: electrochemical general power, industrial electric heating and isolated-plant applications. These divisions are handled by committees, the plan being to develop an organization for rendering service to member companies in the way of compiling useful data on power installations. Some months ago a list of industries in which applications of electric power have been made was sent to central-station companies with request to check off those on which data could be supplied. The returns were then compiled and data on specific installations requested from the different companies, with the result that information on every line of industrial application of electricity will be available. This information is in the hands of the Handbook Committee and later will be presented in printed form.

Tentative plans were made for the activities of the Bureau at the 1917 convention, which will include another "get-together" power sales dinner. One of the features of the executive committee meeting were impromptu talks given by the members on power sales, which led to free exchange of ideas and practices, greatly aiding in the furtherance of the work of the Bureau.

ILLINOIS ELECTRICAL CONTRACTORS' ASSOCIATION TO MEET IN CHICAGO.

Program for Semi-Annual Meeting Which Is to Be Held at Hotel Sherman, January 25 and 26.

The semi-annual meeting of the Illinois Electrical Contractors' Association will be held in Chicago, Ill., January 25 and 26. Headquarters will be established at the Hotel Sherman.

Norman F. Pierce, president of the Association, in issuing an announcement concerning the meeting stated that inasmuch as the greatest field for improvement lies in the sales organization of electrical contractors, it is intended to make the subject of selling the keynote of the convention. Mr. Pierce states that many prosperous department stores have been and still are faced with competition as keen as any electrical contractor, and still they are meeting this competition and prospering.

A program of prominent speakers has been arranged, which includes John F. Gilchrist, vice-president of the Commonwealth Edison Company, Chicago; William A. Durgin, also of the Commonwealth Edison Company, who will speak on "Applied Illumination"; Harry Grant, of the Western Electric Company, whose subject will be "Set the Pace and the Others Will Follow"; J. Marron, of Rock Island, who will discuss "Co-operation With Central Stations," and A. A. Cameron, of the National X-Ray Reflector Company, who will speak on the subject of "How to Sell an Article That Has Merit."

The business sessions will be taken up with reports of outstanding committees, prominent among these being the Committee on Electrolysis and the Committee on Concentric Wiring. The annual banquet of the Association will be held on Friday night.

L. B. Van Nuys, Peoria, Ill., is secretary of the association.

ENGINEERING SCHOOLS TRYING TO CO-OPERATE WITH ENGINEERING PROFESSION.

Notable Address at Annual Dinner and Meeting of the Western Society of Engineers.

The forty-seventh annual meeting and dinner of the Western Society of Engineers was held on the evening of January 10 at the Hotel Sherman, Chicago. Nearly 400 members and guests sat down to the dinner. William L. Abbott acted as toastmaster. A brief abstract of annual reports was presented by Secretary Layfield. B. E. Grant, retiring president, made an address reviewing the early history of the Society, which was organized in 1869, and calling attention to its high standing in the engineering field. The presentation of Octave Chanute medals for the best papers read before the Society on engineering subjects was then made, the recipients being Curtis McTownsend and W. M. Wilson.

The result of the letter ballot and election of new officers for the ensuing year was then announced as follows: President, Henry J. Burt; first vice-president, D. W. Roper; second vice-president, James N. Hatch; third vice-president, W. W. DeBerard; treasurer, C. R. Dart; trustee, O. F. Dalstrom. President-elect Burt then made a brief inaugural address, in which he announced that the new administration would do its utmost to bring about a realization of a constructive program.

F. E. Turneaure, dean of the College of Engineering, University of Wisconsin, then made the principal address of the evening on "The Engineering School and the Engineering Profession." In this he reviewed the history of engineering from the time of the ancients to the present, showing that early engineering structures were based on the limited experience of the time, and that it was not until a century ago that engineering developed into a co-ordination of applied science with experience. He contrasted the engineering development in this country with that in England and other European countries. In speaking of the engineering schools, he said that they are trying their utmost to co-ordinate their instruction with the actual needs of the engineering profession, and he urged that a still closer co-operation between practicing engineers and engineering educators be brought about.

James Keeley, editor of the *Chicago Herald*, made an address on "Some Thoughts About After-War Business Conditions," pointing out the need for American business men to develop carefully thought out policies to meet what will

be very keen competition by nearly all the business interests of the European countries now at war. Based on his experiences in a recent trip to Europe he cited numerous instances of the aggressive measures being undertaken by both the governments and the financial and business interests in the belligerent countries to rebuild their foreign trade at the close of the war.

The meeting concluded with a one-act comedy entitled "Why Is a Structure?" in which participated a number of the leading members of the Society. On January 11 a large number of members made a special tour of inspection of the plants of the Pullman Company and the Illinois Steel Company.

PACIFIC COAST SECTION, N. E. L. A. FORMED

Officers Elected and Committees Appointed at Organization Meeting in Los Angeles.

The Pacific Coast Section of the National Electric Light Association was organized at a meeting of representative electrical men held in Los Angeles on January 6.

Aside from organizing and determining to hold a convention in April, the most important business transacted was the appropriation of $500 for carrying on the investigation of insulator troubles and the request that Class D members (manufacturers, jobbers and electricians) be put on a parity with Class A members as regards voting and holding office.

The following officers and executive committee were elected for the ensuing year:

President, R. H. Ballard, of Los Angeles.

Vice-presidents, H. F. Jackson, of San Francisco, and Samuel Kahn, of Stockton, Cal.

Secretary, A. H. Halloran, of San Francisco.

Treasurer, A. N. Kemp, of Los Angeles.

The members elected to the Executive Committee were as follows: Henry Bostwick, Pacific Gas & Electric Company, San Francisco; W. W. Briggs, Great Western Power Company, San Francisco; Wm. Baurhyte, Los Angeles Gas & Electric Corporation, Los Angeles; George S. Campbell, Truckee River General Electric Company, Reno, Nevada; E. R. Davis, Pacific Light & Power Corporation, Los Angeles; W. P. Southard, Albuquerque Gas, Electric Light & Power Company, Albuquerque, N. M.; F. S. Viele, Prescott Gas & Electric Company, Prescott, Ariz.; A. Emory Wishon, San Joaquin Light & Power Corporation, Los Angeles; A. B. West, Southern Sierras Power Company, Riverside, Cal.

President Ballard announced the appointment of a Public Policy Committee, as follows: John A. Britton, chairman; W. A. Brackenridge, H. H. Jones, S. M. Kennedy and A. G. Wishon.

The personnel of the engineering, commercial, accounting and membership committees will be announced later.

NEW FRANCHISES FOR DALLAS LIGHT AND STREET-RAILWAY COMPANIES.

Extensive Improvements Involved in Franchises, Which Will Be Ratified by Vote on April 3.

The Dallas (Tex.) City Commission has submitted to vote of the taxpayers the proposition of granting franchises for organizing a proposed new electric-lighting and street-railway company in Dallas. The election will be held April 3. The franchises have already been granted by the commission and the vote upon them will be in the nature of a referendum. Immediately upon granting the franchises, the attorneys for J. F. Strickland, who will head the new lighing company, and C. W. Hobson, head of the new street-railway company, filed bonds in the amount of $1,000,000 to guarantee to the city the carrying out of specified agreements to comply with the ordinances. There were four surety bonds, as follows:

"J. F. Strickland and his associates will pay to the city of Dallas the sum of $250,000 for failure to make $2,000,000 worth of improvements to the light and power properties in Dallas."

"C. W. Hobson and his associates will pay to the city of Dallas the sum of $200,000 for the failure to make improvements, extensions and betterments to the amount of $1,000,000 on the street railway lines."

"C. W. Hobson and his associates will pay to the city of Dallas the sum of $200,000 in case of their failure to construct a new interurban at least 30 miles long, with Dallas as a terminus, work to begin on the new lines within six months after the new company begins operations."

"C. W. Hobson and his associates will pay to the city of Dallas the sum of $350,000 in case of failure to construct into Dallas a second interurban line not less than 30 miles in length, provided the revenues of the street-railway company reach an amount equal to specified contract terms."

CALIFORNIA PUBLIC UTILITIES TO MAKE EXTENSIVE PLANT IMPROVEMENTS.

Hydroelectric Companies Plan Expenditure of $16,700,000 in Northern California During Year.

Extensions and improvements in public utilities will be the object of more than two-thirds of the $25,000,000 expenditures during the coming year which will be made by California electric companies subject to the approval of the State Railroad Commission. Some of the applications for development work have already been granted, while the remainder are still under investigation by the commission with prospects good for their approval.

Hydroelectric corporations are to the front as proposing the major portion of the $16,700,000 development planned in the northern part of the state. All of the public utilities operating in that section propose enlargement of their plants, extension into new territory, and improvement of systems already in operation. The following outline covers some of the development work contemplated:

The Western States Gas & Electric Company is taking over the Placerville Gold Mining property, consisting of a water system, and will increase the capacity of its hydroelectric plant at a cost of $200,000.

The Pacific Gas & Electric Company is winding up its purchase of the Oro Electric properties, involving $1,800,000, and is planning an issue of from $3,000,000 to $5,000,000 more of securities with which to provide the funds necessary to increase the capacity of its Lake Spaulding dam, obtaining thereby 66,000 additional horsepower.

The Great Western Power Company has one of the most elaborate programs of development for the coming year, but has thus far disclosed only a part of its plan for hydroelectric work. This includes a gradual development of Big Meadow dam property, involving $3,000,000.

Copper Production of the United States.

The United States Geological Survey has issued a chart showing graphically the mineral production of the United States covering the calender years 1906 to 1915 inclusive. It is interesting to note that the production of copper has maintained a steady increase during each successive year covered by the report, the production in 1906 being 917,805,682 pounds having a value of $177,136,497 as against a production for 1915 of 1,388,009,527 pounds, having a value of $242,902,000. There has also been a substantial increase in the production of tungsten ore, the 1906 figure being 928 tons as compared with 2,332 tons for 1915, having a total value of $4,100,000.

FINANCING CONTRACTORS' HOUSE WIRING GOOD POLICY FOR CENTRAL STATIONS.

President Edgar, of Boston Edison Company, States Contractors Should Do All Interior Wiring in Hearing Before Massachusetts Commission.

At a hearing recently before the Massachusetts Gas and Electric Light Commission on a petition of the Boston Edison Company to authorize a stock issue amounting to $4,500,000, Charles L. Edgar, president of the company, touched upon the Boston Edison's house-wiring campaign and the financing necessary.

"The wiring of houses is the first fundamental thing that would naturally be done by a company. The result in Chicago is that they have no competition; they have no one just looking up business for them. We have 200 or 300 wiring contractors in our territory, all of whom are working to get business for us. We consider this a tremendous asset."

The company does no inside wiring, leaving that to the contractors, but financing the payments for the work. It was found that there was a very large number of old houses that would be wired, but their owners were unable or unwilling to make the outlay.

The company uses about $100,000 in financing the plan whereby the contractor is paid promptly for the work, the company being reimbursed in installments. The capital has been turned over frequently, making the interest charge against each account comparatively small. All the expense of the sales department is paid for by existing customers, but it is for the sake of getting new ones. This benefits the company in the increased output of energy resulting, and ultimately benefits the existing customers through the possibility it affords for lower rates.

Mr. Edgar stated that it has long been the company's policy to let all its construction work under contract, rather than do the work itself. This applies to stations, conduits, and manholes and the installation of machinery and cables. "I think it is by all odds the most economical thing to do as we have done. It is entirely a question of the average of the work. For example, if we had enough men on our payroll to take care of all our emergencies, we would have months in the year when there would be nothing for them to do."

It is better, said Mr. Edgar, to deal with contractors who have other jobs, and let the others help pay their overhead expenses. Referring to the service station, built by the Stone & Webster Engineering Corporation, by the day without bids, Mr. Edgar said the Edison Company bore but a tithe of the overhead costs. He defended the practice of letting this contract without competitive bids, asserting that few power stations are built on competitive bids. "Stone & Webster don't charge for contingencies, because they don't have that kind of loss," he said.

Mr. Edgar did not believe in a central station dealing in fixtures. This would result in ill feeling between the fixture merchants and the company. The Edison company prefers to have the jobber work with it whole-heartedly. Mr. Edgar believed the engineering problems of a large company are greater in proportion to their size than they are with the smaller companies. The latter have plenty of models that they can copy, while the big companies have to break new ground. The new station in South Boston is going to be in advance of anything in the country, ahead of the times, he asserted.

In the course of the hearing it was brought out that Sidney Hosmer, in charge of construction for the Edison Company, was a director in the Lundin Electric Company, and owner of one-sixth of the capital stock. The Boston Edison Company has done considerable business with this concern, but whenever its services have been required Mr. Hosmer has made it a point to keep out of it, decisions in connection with it being left to subordinates in the office. The relation was entered into in 1901 or 1902, when the Boston Edison Company decided to give up the shop run up to that time by the Boston Electric Light Company. The amounts paid to Lundin have been about $25,000 to $30,000 a year.

Chairman Weed of the Commission expressed regret at learning of the relationship and trusted such relations would terminate, as corporations cannot be too scrupulous in the matter of contracts.

CO-OPERATIVE BUYING AND ESTIMATING DISCUSSED BY WISCONSIN CONTRACTORS.

These Subjects Feature of Milwaukee Convention of Electrical Contractors' Association of Wisconsin.

The fourteenth annual meeting of the Electrical Contractors' Association of Wisconsin, held at the Hotel Wisconsin, Milwaukee, January 15-17, was occupied with discussions on such important subjects to the contractor as co-operative buying, quantity estimating, enforcement of underwriters' rules and installation of farm-lighting plants.

The first day of the convention was devoted to business sessions at which, besides the regular business of the association, a report of the annual meeting of the National Electrical Contractors' Association was presented by Herman Andrae, representative of the Wisconsin contractors.

Tuesday morning a closed session was held at which A. M. Kailing, of Milwaukee, gave a talk on "Co-operative Buying," in which he outlined some of the experiences of Milwaukee contractors in this direction. C. E. Flamboe, of the Milwaukee Mill Bureau, followed with a talk on "Quantity Estimating." A discussion on the benefits of quantity estimating was led by W. H. Schmidt, Jr., and resulted in a general exchange of ideas on this question.

An open session was held Tuesday afternoon, President Natwick introducing P. T. Bowler, of Julius Andrae & Sons Company, who, after introductory remarks, read excerpts from a paper on the merchandising of electrical appliances by F. M. Feiker, editor of *Electrical World*.

J. R. Morrissey, superintendent of the Electrical Department of the Wisconsin Inspection Bureau, gave an address of "Enforcing the Underwriters' Rules." He reviewed briefly the purposes of the National Electrical Code, referring to the methods of preparation and revision and explaining why the contractor should be interested in this work. He also commented upon the work of the Bureau of Standards in preparing the National Electrical Safety Code, laying emphasis on the lessening of fire hazards that will result from its enforcement. Mr. Morrissey then gave an outline of the organization, purpose and work of the Electrical Department of the Wisconsin Inspection Bureau. He stated that the bureau will make every effort to raise the standards of electrical construction in Wisconsin, and solicited the co-operation of the contractors.

Past Jupiter S. A. Hobson followed with a talk on "Jovianism." He referred briefly to the founding of the order, what it had accomplished and impressed upon the association the importance of the Jovian Order to the electrical industry.

A description of farm-lighting plants, their installation, operating characteristics and other features, was given by W. D. Kellogg, sales engineer of the Globe Electric Company, Milwaukee. Mr. Kellogg described the different types of farm-lighting plants now being manufactured, going into details as to the proper type of plant for different classes of customers. He also gave a number of valuable hints to contractors making such installations for the prevention of unsatisfactory results. The discussion following the paper was concerned chiefly with the advantages and disadvantages of the different kinds of storage batteries used in connection with such plants.

The most important social feature of the convention was the annual banquet of the association, held Tuesday evening, at which there was an attendance of about 150. The concluding business sessions of the association were held Wednesday.

REGENERATIVE BRAKING DISCUSSED BY AMERICAN INSTITUTE.

Important Discussion at Regular Meeting Held at Pittsburgh on January 12—Attendance Over 200.

The 328th meeting of the American Institute of Electrical Engineers was held at Pittsburgh, Pa., on January 12. The meeting was of a special character in some respects, in that the morning and afternoon were devoted to a series of committee meetings, a meeting of the board of directors, and numerous inspection trips to industrial plants, etc., in and near Pittsburgh. An informal dinner was served in the evening at the Fort Pitt Hotel, at which over 200 were in attendance. Directly after the dinner a technical session was held under the joint auspices of the Pittsburgh Section and the Traction and Transportation Committee. The meeting was presided over by President H. W. Buck. A paper on "Regenerative Braking of Electric Vehicles" was presented by R. E. Hellmund.

Regenerative Braking.

Mr. Hellmund's paper discusses the problems met in applying regenerative control to electric railways. The purposes, advantages, requirements and disadvantages of regenerative control are first pointed out, and then the author takes up the description of various systems. In doing this, special attention is paid to those systems which are well adapted to illustrate some fundamental principle, and to those which are of some practical importance. Other systems are, on account of space limitations, mentioned only briefly or entirely omitted.

The three-phase system is discussed under the following heads: Regeneration near synchronous and above synchronous speeds; line regulation; practical results and safety of operation; influence upon power-factor; regeneration at speeds below synchronism. The phase converter system is next taken up, with a consideration of the requirements of such a system, and practical results attained.

Direct-current systems of regenerative control and their problems are exhaustively discussed, under the following heads: Series, shunt, and separately excited generator; classification and description of separately excited systems with generators operated by line voltage; inherently constant excitation; excitation varying with the line voltage; excitation varying with the regenerated current; series-parallel control; capacity of exciter and switches; systems with variable armature voltage; miscellaneous direct-current systems; transmission system and substations.

The next division of the paper deals with alternating-current commutator-motor systems, including those with separately excited generators, armature self-excited generators, excitation varying with the regenerated current, and stator self-excited or load-excited generators, and the subject of commutation is also discussed. The possibilities of regenerative control with a vapor converter are analyzed.

Mr. Hellmund's conclusion is that, in view of the numerous possibilities for successful regeneration, only a few of which have been considered in his paper, it is to be expected that regenerative braking will soon assume great commercial importance. It should, therefore, be exhaustively considered in any new electrification, and the time is approaching when its possible application should be investigated for the larger existing non-regenerative installations. In view of the practical advantages of regeneration for heavy railroad work, it is even quite likely that regeneration will in time become one of the factors which will win some railroads, now operated by steam, over to the electric cause.

Discussion.

The discussion was opened by Robert Lundell, who referred to his experiments in regenerative braking as far back as 1895 when he made some tests with small regenerative motors. At that time adjustable-speed motors were not good enough to give a sufficiently wide range of speed, so that he used motors which were furnished with double commutators.

E. F. W. Alexanderson pointed out that the two requirements which must be realized for a practical braking system are that the regenerating dynamos should have such volt-ampere characteristics as to have electrical stability and such speed-torque characteristics as to realize mechanical stability. The series motor has stable electrical characteristics, whereas a differentially compounded generator is inherently unstable and can not be operated in multiple with another compound generator without means for neutralizing the instability. If a series motor is to be used as a generator it must obviously be a generator of the type which is known to be electrically stable. The relations defining stability already exist in the motor connection and therefore the same relations with reference to increments of currents must be reproduced in the generator connection. One way of arriving at this result is to superimpose upon the normal motor currents a current in the field from a source of separate excitation which has a drooping or flexible characteristic so that only the absolute values of the currents are changed while the increment relations are maintained.

A. J. Hall said that a successful regenerative control must be as reliable as present-day equipments without regeneration. There are two classes of service, main-line locomotives and car equipments, which must be considered separately when dealing with this problem. Regeneration on car equipments, especially for multiple-unit equipments, will be used mostly to stop trains. The control equipments should be arranged for automatic acceleration and regeneration, and work automatically in conjunction with the air-brake system to effect a smooth and reliable stop. Regeneration on locomotives will be used primarily to descend grades at certain speeds, and may also be used to bring a train to a stop. In connection with regenerative locomotives the master controller should be arranged for step-by-step acceleration and regeneration, and the manipulation must be simple. It should be possible to change from acceleration to regeneration without opening the main motor circuits, thus making a surgeless transition, and it should not be necessary to continually regulate the master controller while descending grades. The locomotive air brakes should be arranged so that, if applied while regenerating, they will be effective only on the trailing load.

R. E. Ferris stated that in retarding a car or train by means of regeneration, one of the fundamental principles involves a change of field strength. It is therefore pertinent to inquire how far the ratio of armature ampere-turns to field ampere-turns may be carried on an ordinary commutating-pole railway motor. A standard stock motor of 115 horsepower nominal rating, 600 volts, 675 revolutions per minute was placed on test and the field strength was varied. The highest point to which the ratio of armature amperes to field amperes was carried was 4.8. The speed at this point was 1,590 with reasonable commutation. With this ratio of current the windings of this motor gave a ratio of total armature ampere-turns to field ampere-turns of 2.65. With the ratio of armature current set at 3.7 the voltage applied to the motor while regenerating was suddenly changed from 560 to 830, with no other result than a slight spit at the brush.

W. V. Turner said that, lest some people think that regeneration will do away with air-brake systems, it should be stated that regenerative braking is needed for reasons of economy, but the air brake will always be needed for reasons of safety. The air brake is needed as a reserve to back up the regenerative brake. With the latter all the control is vested in one or two units, where the failure of

one means a 50 or 100 per cent failure of the regenerative system. With the air-brake system, however, the control is vested in from 10 to 150 units, according to the number of operative brakes. The failure of one unit is then of little significance. There should be an automatic interlock between the regenerative brake and the air brake. It will oftentimes be necessary or desirable to use the air brake in conjunction with regeneration. In such cases the air-brake on the locomotive must be automatically cut out and released, else the adhesion between the drivers and rail will be overtaxed and slid flat spots will occur. Where traffic is largely in one direction, or for other reasons, it will be found inconvenient to use the same number of locomotives in a train for descending a grade that is used for the ascent. In this event the air brakes must be used to supply the additional retarding effort required to control the train.

H. M. Hobart outlined the historical features of regenerative braking, referring to the tests by Robert Lundell, and also the tests made in England by Mr. Rayworth, in 1896, and E. H. Johnson, in America, about the same time.

C. L. G. Fortescue, who was not present, contributed a written discussion, in which he said that one of the principal advantages of electrification is that the source of energy is centralized and the various demands upon it are averaged so that it is capable of supplying a large demand at one point, because there is a corresponding less demand or regeneration of energy at another point. This advantage is used to the maximum extent with a locomotive having constant-speed characteristics. It appears that in order to obtain all the possible advantages from electrification, the characteristics of the motors should be such as to take full advantage of the centralization of the power house, both in respect to speed requirements in climbing grades and ability to regenerate on down grade. These requirements in his opinion indicated that the motor having constant-speed characteristics is the ideal motor for heavy traction and long-haulage electrification. The results obtained in the electrification of the Elkhorn grade of the Norfolk & Western Railway seemed to justify that conclusion.

F. D. Newbury said that the discussion had been confined to the locomotive, but that the line to the substation, the machinery in the substation, the transmission line and the generating system must also be considered in the application of regeneration to existing systems. The characteristics of the substation machinery must be investigated, particularly if the substation happens to have synchronous converters. Reversal of power means a change in the operating conditions of the machines that may lead to trouble if the apparatus is not stable. This does not mean that it is necessarily a serious matter, but one that must be investigated.

W. B. Potter, in a communication, stated that the results of a year's service have unquestionably demonstrated the success of direct-current regeneration and its value in improving the train service on all down grades which would otherwise require the use of the air brakes. On down grades, ranging from 2 to 0.6 per cent, and through a wide range in speed, the trains are controlled by regeneration, the air brakes being used only for the purpose of stopping. The variations in speed incident to repeated applications and release of the air brakes, hot brake shoes and delays incident to inspection, are noticeably absent under regenerative handling, and the mountain division under electric operation has become a division on which lost time is made up, rather than added to. Under some conditions regeneration may prove profitable on other than grade service, but as the value in this connection will be influenced by the saving in energy and lower maintenance of mechanical equipment as offset by presumable increase in cost and maintenance of electrical equipment, the extent to which it may be used will be largely influenced by the skill and ingenuity in devising simple methods of accomplishing the result. Mr. Hellmund's conclusions might be emphasized by saying that regenerative braking has already assumed great commercial importance, and that it is one of the factors now having a favorable influence toward the electrification of mountain service and ruling grades.

N. W. Storer remarked that he, in common with other engineers, had worked for a long time with the ideal in mind of returning the lost energy which is spent in brake shoes, heating up brake shoes and ruining the braking equipment.

The paper was also discussed by F. R. Phillips and K. A. Simmons. Mr. Hellmund made a brief closure, after which the meeting adjourned.

CO-OPERATION FOR FOREIGN TRADE SOLICITED.

Movement on Foot to Engage the Support of American Manufacturers in Interest of Webb Bill Before Congress.

A big drive by trade bodies of the United States to the end that the Senate committee on interstate commerce may favorably report, and the Senate pass, the Webb House bill authorizing American exporters to co-operate on an equality with foreign rivals, and to gain efficiency for trade after the European war, has begun. Organizations and individuals representing all elements of manufacturing, merchandising, national production, transportation and finance in foreign trade, have appeared before the Senate committee and endorsed the Webb bill, as a whole. The National Foreign Trade Council, through H. C. Lewis and Robert H. Patchin of New York, have placed before the Senate committee a report which says in part:

"Even before the war, doubt as to the application of the anti-trust laws compelled American exporters individually to cope with government-encouraged combinations of foreign rivals united to resist American competition, and often to sell to combinations of foreign buyers equipped to depress the prices of American goods.

"Co-operation in export selling, with every safeguard against illegal restraint of domestic trade, is imperative to meet proposed post-bellum co-operative buying not only by groups of European industries but even by governments with the object of controlling prices.

"Unless the Webb bill is passed the legality of export co-operation established, many industries of moderate size will be unable to enter foreign trade because of prohibitive expense which co-operative effort would reduce.

"Greater stability of export business could be obtained through co-operation and a wider distribution obtained in the benefits of over-sea sales as a balance wheel against recurring periods of domestic depression and unemployment.

"The existing doubt, amounting to prohibition, of the right to co-operate has enabled foreign buyers, playing American producers one against another, to obtain American raw materials cheaper than American consumers which, with lower European labor cost, gives the European merchandise fabricated therefrom an added advantage in competition with American goods and confers upon our competitors a practical subsidy against ourselves. Since the countries with which 95 per cent of American commerce is conducted have their own anti-trust laws, the application of American anti-trust laws to exporters merely subjects Americans to a double standard and cannot reach their foreign competitors."

The Council supported the recommendation of the Federal Trade Commission for the elimination of two amendments added to the Webb bill in the House which the Commission holds leave the present existing condition unchanged.

Miscellaneous NEWS NOTES

Lecture on Alaska at Lynn Section Meeting.—H. W. Du Bois, consulting engineer of Philadelphia, gave a lecture on "Alaska" at the January 10 meeting of the Lynn Section, A. I. E. E. By means of lantern slides and moving pictures there was shown the avalanching of the Childs glacier, the eruption of the Katmai volcano, and copper mining and railway construction scenes. The speaker was introduced by Prof. Elihu Thomson.

Estimates on Available Water Power in Washington.—Washington has a greater amount of available water power than any state in the Union. Conservative figures place the amount at 5,000,000 horsepower, but reports recently read in Congress state that there is more than 10,000,000 horsepower now available in the state. Developed water power has reached about 306,000 horsepower.

Bill to Strengthen Massachusetts Licensing Law.—A bill is to be introduced in the Massachusetts Legislature which would raise the age limit of journeymen (Class B) electrical workers who held certificates of fitness, from 18 to 21 years, and make it mandatory on electrical inspectors and others concerned in the enforcement of the licensing law to prosecute violations coming to their attention.

Pennsylvania Utilities Company Placing Wires Underground.—The Pennsylvania Utilities Company, of Easton, Pa., has just completed and placed in operation one section of a conduit installation which is to take the place of overhead transmission in the business section of the city. The completed portion cost approximately $30,000. The whole work when completed will cost in the neighborhood of $250,000.

Central-Station Company Seeks Injunction Against Establishment of Municipal Plant.—A petition has been filed in court by the Central Illinois Utilities Company to prevent the erection of a municipal electric-lighting plant at Gibson City, Ill. The company has been furnishing electricity for Gibson City, but a few weeks ago at a special election Gibson City taxpayers voted to issue bonds for the erection of a municipal plant.

Increase in Electrical Construction Work at Rock Island.—Electrical construction work in Rock Island, Ill., for 1916 is practically double that for the year 1915, according to a report prepared by George Kling, electrical inspector. During 1915 there was 1,000 wiring permits issued, involving electrical work having an aggregate value of $50,046. For 1916 there were 1,101 permits issued, the electrical work involving an expenditure of 96,720.

New Station of New Jersey Power & Light Company in Operation.—A power station has just been completed for the New Jersey Power & Light Company, of Dover, N. J. The plant is equipped with one 3,500 kilowatt, 60-cycle turbogenerator; three boilers of 509 horsepower each, operating at 210 pounds pressure with 150 degrees superheat; underfeed stokers, etc. Coal is delivered from a trestle 500 feet long. The radial brick stack is 200 feet high and 12-foot inside diameter. The plant will partly supersede and partly supplant the company's station at Boonton, N. J.

Texas Legislature Considers Bills Affecting Electrical Interests.—Among the several bills directed against corporations which have been introduced in the Texas Legislature at the present session is one which provides that no light and power company, firms or business interests that already own an electric light and power plant shall be permitted to purchase, lease or acquire the business of another electric light and power concern. Another bill affecting electrical interests provides for creating the office of chief electrical inspector to be appointed by the governor and requiring the licensing of firms and individuals in the electrical contracting business.

Toledo to Have Completely Electrified House.—The first fully electrically equipped house to be built in Toledo, O., is now under construction in the fashionable Ottawa Hills residence section of that city. It will contain an electric range, lamps, door-bells, telephone, mangle and ironer for the laundry, vacuum cleaner, cigar lighters, vibrators, curling irons, hair dryer, chafing dish, toaster, percolator, flatiron, heating pad, and an air heater in the bath room.

Bon Fire for Municipal Debts.—A "municipal bon fire" was held in Lake City, Minn., a few weeks ago for the purpose of burning $3,000 of city bonds retired from a sinking fund established from the profits of the electric-lighting plant. During the past four years nearly $20,000 debts have been "burned" from the earnings of the plant, and has helped greatly to put the city on a satisfactory financial basis. Credit for this showing is given to J. C. Doughty, president of the Board of Water and Light Commissioners of Lake City.

Utility Valuations Discussed in St. Louis.—At a meeting of the St. Louis Jovian League of Electrical Interests held Tuesday, January 9, 1917, at the Mercantile Club, James E. Allison, consulting electrical engineer and former engineer, Public Utilities Commission, delivered an interesting talk on "The Regulation of Public Utilities." Mr. Allison, after outlining briefly the development of property control and regulation, turned to a general consideration of property valuation as affected by earnings and depreciation. During the course of his talk, Mr. Allison cited several instances of the wide variance of opinion as to what forms the basis of accurate valuation and pointed out the necessity of a closer understanding by both utilities and commissions of the correct principles of property valuation. Mr. H. H. Humphrey presided as chairman.

Medals Presented to Liberty Flood-Lighting Engineers.—At a meeting of Mayor Mitchel's Committee of 200, which welcomed President Wilson to New York when he dedicated the flood-lighting system at the Statue of Liberty, medals were presented to H. H. Madgsick, of the National Lamp Works of General Electric Company; C. H. Wheeler, of the General Electric Company; Robert F. Carbutt, railway engineer, and William E. Richards, electrical engineer of the Toledo Railways & Light Company. The medals were presented in recognition of the work they did in planning and constructing the plant for the illumination, and were cast in the form of a miniature Statue of Liberty in bas relief, with an inscription on the reverse side. It developed at the meeting that the government will be asked to build a suitable approach and also to decorate the interior of the statue. A sub-committee was appointed and the request to the government will be in the form of a memorial presented to Congress.

New York Electrical Society Holds Interesting Meeting.—The New York Electrical Society held its 352nd meeting at the Choralcelo Galleries, 17 East 40th Street, New York, on January 15. E. R. Knowles lectured on "Dust, its Universality, its Conservation and its Elimination," giving some new and valuable data on the subject, and indicating the important part played by electricity in the most effective method of dust separation. After Mr. Knowles' address, Guy P. Norton spoke on the operation of the Choralcelo, the music of which is produced electrically. A program of the music was rendered. Afterwards Mr. Norton explained how the various tone values were created, modified and colored, his talk being accompanied by many striking illustrations. The Choralcelo principle is based upon the discovery of a method of controlling the frequency of magnetic impulses, and of synchronizing their attack with the natural and fundamental vibrations of sonorous bodies.

How to Stimulate Electric-Truck Sales

Some Valuable Suggestions for a Co-Operative Sales and Advertising Movement That Will Focus Favorable Attention on the Electric Commercial Vehicle

By J. H. McDOWELL

THE great problem facing the manufacturers of motor trucks is distribution. This problem is especially annoying to those engaged in exploiting the battery-driven motor truck. Shall we employ solicitors to personally interview what we consider good prospects? Shall we establish a large number of agents who will invest their own money in promoting the sale of our product? Shall we advertise extensively in a general or a specific way and depend upon such publicity to bring us prospects? Shall we select a certain line of business and work it both by advertising and personal solicitation, or shall we use a combination of two or more of these plans in order to get our product distributed on a paying basis? These are questions which come frequently before the executives of motor-truck builders, both electric and gas. The solution of the problem has not yet been effected. There are no precedents to follow. All the manufacturers have tried different methods but none of them have hit on any one method that is producing glaring results. The most effective plan so far adopted by electric-truck interests has been to employ special representatives to call on a selected list of prospective users of large fleets—those concerns which seem able to purchase in quantities and have the necessary capital to go into the proposition on a large scale. These men have been enthusiastic about the possibilities of the electric and cautious about spending their efforts upon those whom they believe easiest to convince. They have covered a limited field and have produced fairly good results, but not such results as should accrue either to themselves or their employers as compared with the equivalent amount of time and effort put forth in other lines of the automobile industry. A small amount of haphazard advertising has been used to supplement the work of these personal representatives, but the publicity has been so spasmodic that it has made no striking impression on that part of the buying public, who should be informed of the wonderful possibilities of the electric commercial vehicle.

I believe the greatest need of the industry today is publicity. We need to force upon the attention of business men the true value of the electric truck to strongly impress them with the fact that the electric is considerably more economical for 85 per cent of their hauling than either horse or gas trucks—to conteract vigorously the intense and widespread publicity the gas truck is getting. This can be accomplished in many ways and one of them that is now being used is having personal representatives give all their time to prospects already somewhat interested. This plan can be greatly improved by putting twice as many men in the field and the value of the plan greatly enhanced by supplemental publicity work along the following lines:

(1). In Chicago, for instance, the Commonwealth Edison Company maintains three or four electric shops to which the public is invited to examine all kinds of electrical apparatus. Men from all walks of life frequent these exhibition rooms and among them are some possible prospects for electric trucks. On the walls of these rooms should be displayed large illuminated pictures of electric trucks used by concerns who are well known locally. These rooms also offer an excellent place for distribution of the literature of all the makers of electric trucks.

(2). The people of Chicago are educated to attending shows of all sorts. The buildings where they are held are always crowded and yet it is difficult to state how many are interested in the goods displayed or how many buy, but the show accomplishes one good purpose—it gives the goods great publicity. An exclusive electric-truck show might be a small affair, but it certainly would be one of the contributing features to general publicity. Electric passenger cars might be displayed at the same time without detracting from the object in view. Chicago is now "ripe" for such an exhibition.

(3). A comprehensive and extensive advertising campaign to cover a period of two years should be inaugurated at the earliest possible moment. I suggest a joint billboard and newspaper campaign. Use at least 200 billboards and change the copy every 60 days, using illustrations of trucks in the service of prominent local concerns and showing different makes of trucks on the various boards. On some boards display only the names of the electric-truck manufacturers. Newspaper advertising should comprise large space on Sundays and holidays and should contain the names of all makers of electric trucks, and reproductions of testimonial letters from users as well as operation figures, both estimates and actual costs furnished by users. Newspaper advertising could be used to supplement the billboard displays. For example, use billboards six months, then newspapers six months, then the billboards again and conclude with the newspapers, or run the billboards for one year and the newspapers for one year.

(4). The Commonwealth Edison Company employs about 20 men who are engaged in promoting the use of large current-consuming devices. These men cover the entire city, calling on large users of electric power. They hold weekly meetings to discuss ways and means of getting more power in use. If these men were instructed to broach the matter of electric trucks to all the people on whom they call, this would create an interest and undoubtedly lead to some good prospects. Whenever these power salesmen find anyone even slightly interested, they should send the names of such to all the electric-truck manufacturers and co-operate with them. These men know the rates being earned and could suggest ways of going at the prospects that would be of material assistance to the truck company's representative. In fact, it would be advisable to pay a small commission to the power salesmen for sales made with their assistance. Any concern using horses and 90 per cent of those using gas trucks are possible buyers of electrics and we are often surprised

A CO-OPERATIVE SALES PLAN

While national advertising is, of course, essential in giving impetus to electric-truck sales, the problem of increasing their use is, to a great extent, local.

Mr. McDowell, who is connected with a prominent electric vehicle firm in Chicago, offers an admirable co-operative plan for boosting electric-truck sales that while originally intended for Chicago, is applicable in many other communities.

The plan was explained before a recent meeting of vehicle interests in Chicago.

to find out just who these people are. Somebody whom we never thought would be a user of trucks buys one and so I believe these power men ought to talk electrics to everyone whom they interview. If some of these concerns have no facilities for taking care of electrics, it is easy to provide such facilities through the co-operation of all the men interested. In order to keep the power solicitors enthused on this proposition arrangements could be made to have the different electric truck makers give them a short talk two or three times a year.

(5). The Commonwealth Edison Company has about 55 substations scattered throughout the city in localities where there is a density of population, usually in outlying business centers. All of these stations should be equipped for emergency charging of 200-ampere capacity. The fact that this service is available might help some large concerns to adopt electrics. Some of these stations are now so equipped and they have been of value to the industry, but all of them should be equipped in this way. These substations should also be made the center of a small direct-current zone. If this radius were fixed and made known to electric-truck salesmen and the business interests in each locality, it would have some weight in deciding between gas and electric equipment. In more than one instance the investment in a motor generator has been the determining factor in turning the prospect from an electric to a gas truck. If such a plan is not feasible then some provision should be made for the rental of a generator or the purchase of one on very easy terms. It will not be possible to build up a prospective load around these substations. The facilities for obtaining direct current must be provided first and then the electric-truck representatives can redouble their efforts in these various localities.

(6). If handled in the proper manner either through the local vehicle section of the N. E. L. A. or through the central station, it is possible to obtain valuable testimonial letters and actual operating costs regarding electric trucks from satisfied users. These could be used by the central-station power salesmen, the electric-truck company's direct representatives and also in the proposed billboard and newspaper advertising campaign.

(7). The central-station company in Chicago owns a large and varied equipment of electric trucks which ought to be available for short demonstration, one or two days at a time. The day has not yet arrived when electric-truck manufacturers can flatly refuse to give demonstrations. There wouldn't be many calls for such work, but occasionally a short demonstration is the only thing that will bring the prospect to a definite decision. If these trucks were available, the manufacturer or his agent would be glad to furnish the driver and pay for the current used and protect the central station from damage to vehicles.

(8). There are a number of vacant stores in the downtown business district which could be rented for short periods of a week or ten days. These stores could be rented in the name of the Commonwealth Edison Company and the different truck makers could furnish chasses for exhibition. The Commonwealth Edison representative as well as the truck company's representative should be in attendance to give complete information to visitors. These exhibits should be advertised in the daily papers and in the street cars. There are a number of business men who would drop in and investigate these trucks when they would not take the time to go to the store, office or shop of the manufacturer. Many men who could use electrics have never seen or examined them and such displays would bring the electric truck almost to their doors.

(9). It is time to start an agitation in the newspapers and magazines and in the city council to prohibit horse drawn vehicles in the downtown business district between the hours of 6:00 a. m. and 8:00 p. m. The street-railway company, the motor interests in general and the entire public would co-operate heartily in such a movement, because the crowded condition and the slow movement of traffic are caused by horse-drawn vehicles.

(10). The matter of proper garaging facilities for commercial vehicles should receive the serious attention of all the interests concerned in developing the electric-truck business. A number of trucks which are now garaged privately would receive better care and be of greater service to their owners if they were kept in a well conducted public garage, and if such facilities were provided in various parts of Chicago, more trucks would be in service. Some concerns are now ready to place orders for single machines or small fleets if they can get proper garaging facilities as easy and as reasonable as they can for gas trucks.

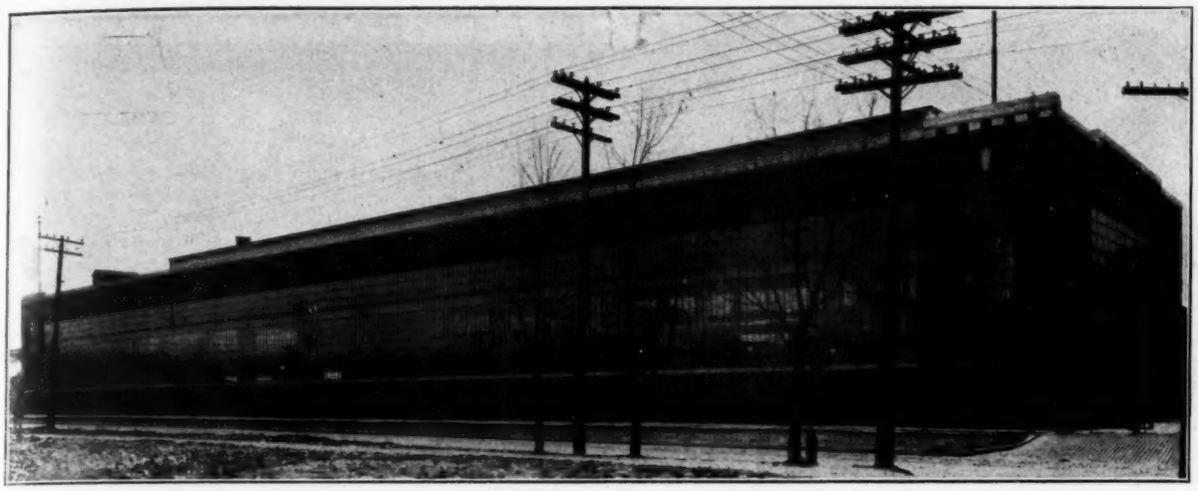
(11). Perhaps this last suggestion could be better taken care of by a central garage with branches, as has been proposed several times. This plan contemplates the establishment of a large garage in the business district where electrics would be handled in the most modern and efficient way and where a system of battery maintenance would be in force. The owner of an electric would either rent his battery and pay for the energy used or rent a charged battery and pay for its use by the day or the mile. This garage would have substations throughout the city so that, if necessary, a truck could run in and pick up another charged battery to use for that day's work or to keep over till the next day. It would not be necessary for the truck to come back to the central garage if it were more convenient to lay over in some outlying district till the next day. The functions of this garage could be further extended so that trucks could be maintained by the year; this service including current, battery, tire and mechanical upkeep. In this way a concern would need to purchase only a chassis and body and then pay so much per year for complete maintenance and operation.

I do not assert that any one of these ideas would increase the use of electric trucks to a very marked degree, but I do say that if all of them are put into effect simultaneously as one great plan the cumulative effect will be such that we will be offered more business than we will be able to handle without largely increased factory facilities.

Kentucky Utilities Company Serves 25 Towns.

The Kentucky Utilities Company, which recently moved its headquarters to Louisville, is now supplying 25 Kentucky town, Horse Cave, Glasgow and Morganfield. In addition to Versailles, Shelbyville, Lawrenceburg, Elizabethtown, Mt. Sterling, Harlan, New Castle, Tyrone, Cynthiana, Greenville, Central City, Winchester, Middlesborough, Richmond, Midway, Burnside, Pineville, Varilla, Eminence, Pleasureville, Uniontown Horse Cave, Glasgow and Morganifield. In addition to these towns the company is also supplying the coal mining operations in the Harlan County field and, besides, is supplying current to transmission companies which operate over the state line in Virginia and Tennessee. The latest town added to the list served by the company is Horse Cave. At present a total of 18 generating stations are maintained by the company, some of them held as auxiliaries for use in emergencies but most of them operated continuously. Various plans as to centralization of the generating plants are understood to be under consideration.

To Flush River to Protect Power Company.—The Pacific Power & Light Company proposes to flush the Naches River, at North Yakima Wash., in order to clear it of slush ice. This is to prevent any freezing or clogging of the mains this winter. The power company has arranged with the United States to obtain water from Bumping Lake to be used in flushing.



Electricity in an Automobile-Wheel Plant

Details of the Motor Installation and Electrical Features of the Kelsey Wheel Company Which Purchases All Its Energy from the Detroit Edison Company

Industrial Power Series—Article No. 188

THIS article describes the motor installation in the plant of the Kelsey Wheel Company, of Detroit, Mich., which comprises an aggregate of 645 horsepower. All energy is supplied by the Detroit Edison Company. The company manufactures automobile wheels for about 80 per cent of the automobile manufacturers, both trucks and passenger cars, and the output for 1916 was 2,688,000 wheels.

In the manufacture of wheels there is needed a large number of comparatively small machines except in the press department and it is important that they be so located that the logical sequence of operations in the manufacturing process be carried out so that the material and finished products do not have to repass through any department. The nature of the machinery used naturally lends itself to individual drive and, to some extent, to group drive with a comparatively small number of machines driven from each motor. By this arrangement a single group or any number of groups of machines can be run during the noon hour or on holidays to accommodate a rush in any particular department. An accident to any group of machines interferes with that group only and if a single motor needs repairs, which seldom occurs, it can be quickly replaced by a spare unit. Friction losses are reduced to a mini-

Distributing Board in Plant of Kelsey Wheel Company, Detroit, Mich.—Edison Service Used Throughout.

Two Views of Punch-Press Department Showing Individual Motors for Each Machine.

mum as there are only short line shafts and small belts. With central-station service, continuity of operation is secured as modern practice provides so many safeguards that interruption of the service is practically impossible. Another important feature is that motor drive affords uniform speeds which are important in the turning out of work of precision and it increases production and quality.

In case of an accident to an operative any group of machines can be quickly brought to a stop without interrupting or in any way affecting other groups. The maintenance expense of large belts and long lines of heavy shafting is eliminated. Furthermore, the electric motor can be overloaded to a considerable extent without serious variation in speed, while with a mechanical prime mover it is either "stalled" or slowed up and as soon as the load is reduced there is a surging caused by the effort of the driving engine to regain its equilibrium. This variation of speed is decidedly detrimental to the quality and quantity of the product.

Changes and Extensions Easily Made.

With electric drive and central-station service machines and motors are easily and quickly regrouped and additional machines and motors can be installed on short notice. Power is always instantly available and it is only necessary to throw in the starting device. Motors can be mounted on the wall or floor or suspended from the ceiling and can be located where room is not needed for manufacturing purposes.

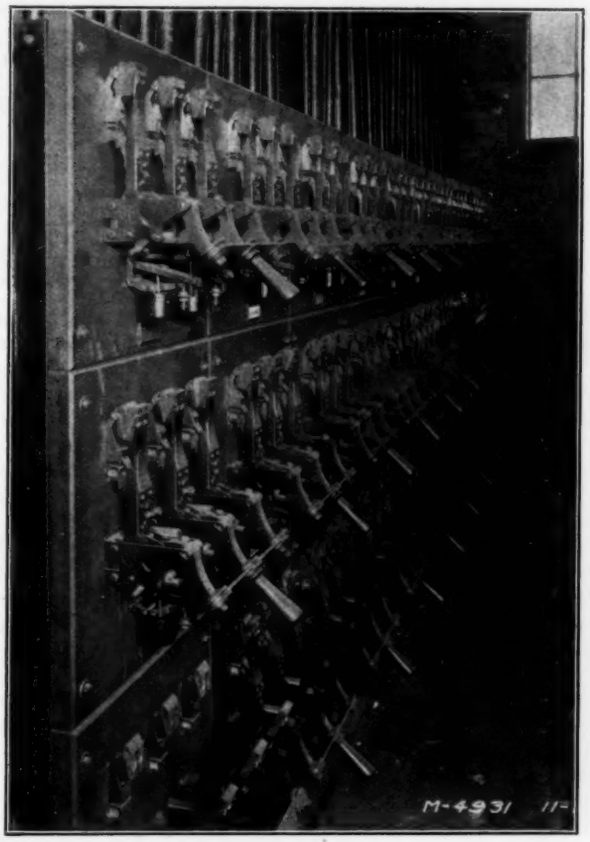
Electric drive affords the only satisfactory propulsion where speed variations are essential for the performance of certain work. Auxiliary machinery such as blowers, air compressors, pumps, etc., can be placed in pits, in outside buildings, or any convenient place without regard to line shafts or other driving methods. Where there are several buildings composing a plant, motor drive is especially adapted to the work. If mechanical drive is used for such conditions either a number of small and inefficient engines are required or cumbersome and power-wasting mechanical transmission has to be employed. The human element of a factory has to be considered as there is better feeling among the workmen where there are desirable working conditions and the surroundings are hygienic. Electric drive materially aids in maintaining these conditions.

Electric drive can easily provide for increases in machinery and in the addition of new buildings as it is only necessary to run additional feeders and the central station provides an abundance of power during the entire 24 hours of each day. This was particularly true in the Kelsey plant, the present article dealing with an addition to the company's original factory. When a belt breaks only one group of machines is affected and with individual drive the belt in question is entirely eliminated. Fire risks are reduced and heavy belt connections from floor to floor are eliminated. Central-station service does much to relieve the smoke nuisance which is important where manufacturing plants are located in the central part of the city. Further there does not have to be made any elaborate provision for the shipment of coal and the disposition of ashes, only enough fuel for some low-pressure heating boilers is necessary.

Details of Motor Installation.

The Kelsey plant, under discussion, was placed in service about two years ago to meet the increasing demands upon the facilities of the company. The company has for the past seven years used Edison service in its old plant. The demand at the present time is about 891 kilowatts.

In the new building are made the brake drum, hubs, and such pressed-steel parts as go into the finished wheel. The power equipment consists of 21 motors with a total capacity of 645 horsepower. All machines, except the small lathes in the tool room, have individual motor drives. The motors are placed in a motor gallery where they are readily accessible at all times. This arrangement leaves the floor clear for stock and does not interfere with the craneway which extends the total length of the building. The wiring is in conduit and all fuses, switches and starting boxes are inclosed in metal, so that there is nothing exposed from which a workman might receive a shock.



Distributing Board in Plant of Kelsey Wheel Company, Detroit, Showing Individual Circuit-Breakers for Protecting Each Motor.

One of the views of the distribution board shows the practice in this connection, a wire screen preventing workmen coming in contact with any exposed circuits or instruments.

Each motor is wired directly to a distributing board on which is mounted its own individual automatic circuit-breaker. There are 33 of these overload circuit-breakers mounted on this board, which was designed by Charles Lakin, plant electrician, to take care of the highly fluctuating current characteristic of this kind of load.

Directly back and within four feet of this switchboard is located a bank of three 4,600 230 volt 700-kolivolt-ampere transformers. They are served by an underground cable from the primary switch vault in the center of the plant, some 500 feet distant. This circuit has at this end an automatic oil switch and the usual disconnecting switches.

The lighting arrangements, both for natural and artificial illumination, are worthy of note. A glance at the illustration herewith shows the daylight arrangement. Mercury-vapor lights furnish the general artificial illumination. These are spaced every 15 feet and hung just below the structural steel of the roof.

The heating is handled by a 60-horsepower motor, directly connected to a fan located in the northwest corner of the gallery. This drives fresh air over steam coils and through ducts under the floor to all parts of the building.

The Central-Station Group Meetings Plan

Organizing Employees Whose Work Is Closely Allied into Groups in Order That Papers and Discussions at Meetings May Benefit Departmental Intercourse and Individual Members in Their Daily Work

By RALPH T. SCHUETTGE
Chairman, Group Meetings Committee
Commonwealth Edison Company Section, N. E. L. A.

IT IS needless to say that such an undertaking as organization of Group Meetings in so large an organization as the Commonwealth Edison Company is no simple task to work out. An exhaustive study of methods of conducting meetings in the various company sections of the National Electric Light Association throughout the country was made and a vast amount of data accumulated. This material was then taken up by a committee representing about fifteen of the most important departments of the company. Numerous meetings of this committee were held and it was finally agreed that the best results would be obtained by making combinations of employees whose work was closely allied and having papers presented and discussed on subjects which would be of value to the individual members in their daily work.

The committee having in mind the individual employee and desiring to organize groups which would appeal to everyone, sent a letter to all employees asking the following questions:

(1) Do you desire to attend the Group Meetings?

(2) In what department are you employed?

(3) With what other department is your work closely allied?

(4) Will you act on a committee?

(5) What inspection trips would you like to make?

Charts which indicated the suggested combinations of departments to be grouped were then prepared. These data having been tabulated, a number of meetings were held by the committee, at which the feasibility of establishing Groups as outlined in the charts was discussed, and a plan finally decided upon for a tentative organization.

After it was agreed as to which departments or division of departments were to be grouped, the next task was to decide on someone to represent each unit of the organization in each group. These men were named the executive committee of the group. It then became necessary to devolve some means of getting active work started. The groups were divided into divisions and division chairmen appointed. Each division chairman called the executive committee together and arranged for the first meeting of the group at which the members of the group elected a chairman, vice-chairman and secretary.

The Group Meetings Committee keeps in touch with the activities in each group by receiving a written report from the Group secretary immediately following the meeting. A form of report for this purpose (shown in the accompanying illustration) was prepared, giving such information as name of speaker, subject, author of paper read, announcement and expenses of meeting.

As an indication of the topics presented and discussed under the Group Meetings plan, the titles of a number of papers read at the meetings held from February to November, 1916, are given: "A Higher Standard of Line Construction," "Knowledge Essential for a Central Station Office Man," "What Constitutes an Efficient Office Force and How Attained," "Underground Distribution of Electricity in Chicago," "The Commonwealth Edison Company's Timekeeping System," "Relations between Public Service Corporations, Their Employees and the Public."

GROUP MEETING REPORT.

_____ Group. Date _____

Held At _____ Began ____ P.M. Adjourned ____ P.M.

Attendance ____ Visitors ____ Opened By _____

Subject _____

Speaker _____

Author of Paper Read _____

Authors of all papers submitted for this meeting _____

_____

Announcements _____

_____

EXPENSES

Prize for Paper awarded to _____ (Name) _____ (Department) $

Stenographer _____ (Name) _____ (Department) $

Miscellaneous (Itemize all expenses other than those provided for above)

_____ $

_____ $

_____ $ _____

$ _____

_____ Secretary

Approved _____ (Division Chairman) Correct _____ (Group Chairman)

(Reports Should Be Typewritten)

Form of Report Submitted by Group Secretaries.

Meetings and Attendance.

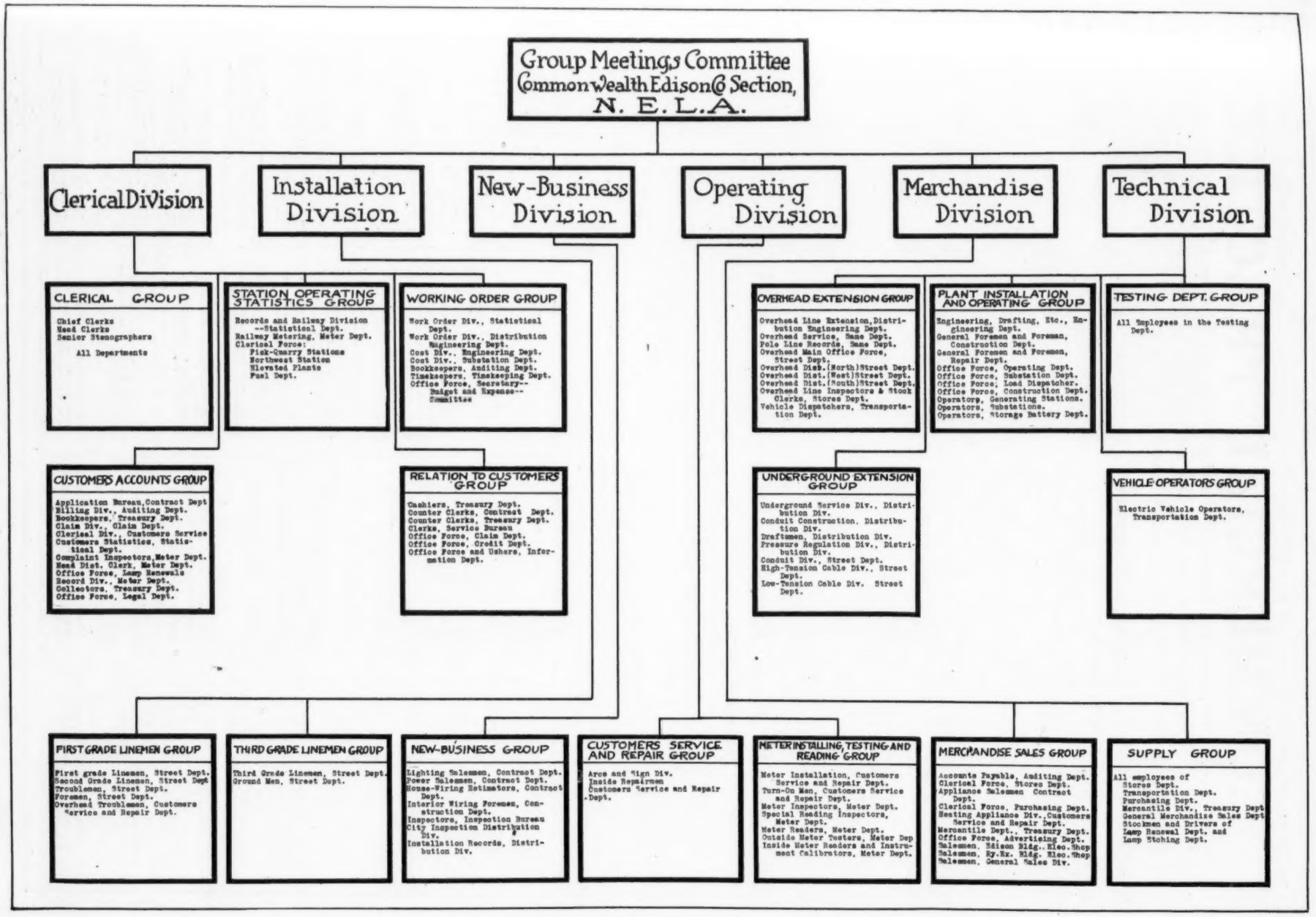
A few statistics on meetings and attendance may be of interest. Approximately 65 per cent of the employees on the membership roll attend all meetings. The following table is a summary of meetings and attendance from February to October, 1916.

SUMMARY OF MEETINGS AND ATTENDANCE.

	Feb.	Mar.	Apr.	May	June	Sept.	Oct.	Total
Meetings	1	1	1	6	7	6	12	34
Attendance	125	80	13	365	371	358	732	2044
Inspection Trips	---	---	---	---	---	---	4	4

As an inducement to the members to write papers a prize of $5.00 was offered for each paper read at a group meeting. Each Group chairman upon his election appoints a papers committee and a prize committee. It is the function of the former to devise ways and means of obtaining papers and then turning them over to the latter committee, which chooses the paper or papers to be read.

A valuable feature inaugurated is the placing on file in the company library of a copy of each paper and its discussion, whenever practical, presented before the Groups, and, inasmuch as these papers will deal more or less with the functions of various departments, a great amount of information and data will be available to those who are interested in the subject of company organization and business administration with the possible consequence of valuable suggestions for improvements.


Group Meetings Committee
Commonwealth Edison Co Section,
N. E. L. A.
Clerical Division
Installation Division
New-Business Division
Operating Division
Merchandise Division
Technical Division
CLERICAL GROUP
Chief Clerks
Head Clerks
Senior Stenographers
All Departments
STATION OPERATING STATISTICS GROUP
Records and Railway Division --Statistical Dept.
Railway Metering, Meter Dept.
Clerical Force:
Fisk-Quarry Stations
Northwest Station
Elevated Plants
Fuel Dept.
WORKING ORDER GROUP
Work Order Div., Statistical Dept.
Work Order Div., Distribution Engineering Dept.
Cost Div., Engineering Dept.
Cost Div., Substation Dept.
Bookkeepers, Auditing Dept.
Timekeepers, Timekeeping Dept.
Office Force, Secretary--Budget and Expense--Committee
OVERHEAD EXTENSION GROUP
Overhead Line Extension, Distribution Engineering Dept.
Overhead Service, Same Dept.
Pole Line Records, Same Dept.
Overhead Main Office Force, Street Dept.
Overhead Dist.(North)Street Dept.
Overhead Dist.(West)Street Dept.
Overhead Dist.(South)Street Dept.
Overhead Line Inspectors & Stock Clerks, Stores Dept.
Vehicle Dispatchers, Transportation Dept.
PLANT INSTALLATION AND OPERATING GROUP
Engineering, Drafting, Etc., Engineering Dept.
General Foremen and Foreman, Construction Dept.
General Foremen and Foremen, Repair Dept.
Office Force, Operating Dept.
Office Force, Substation Dept.
Office Force, Load Dispatcher.
Office Force, Construction Dept.
Operators, Generating Stations.
Operators, Substations.
Operators, Storage Battery Dept.
TESTING DEPT. GROUP
All Employees in the Testing Dept.
CUSTOMERS ACCOUNTS GROUP
Application Bureau, Contract Dept
Billing Div., Auditing Dept.
Bookkeepers, Treasury Dept.
Claim Div., Claim Dept.
Clerical Div., Customers Service
Customers Statistics, Statistical Dept.
Complaint Inspectors, Meter Dept.
Head Dist. Clerk, Meter Dept.
Office Force, Lamp Renewals
Record Div., Meter Dept.
Collectors, Treasury Dept.
Office Force, Legal Dept.
RELATION TO CUSTOMERS GROUP
Cashiers, Treasury Dept.
Counter Clerks, Contract Dept.
Counter Clerks, Treasury Dept.
Clerks, Service Bureau
Office Force, Claim Dept.
Office Force, Credit Dept.
Office Force and Ushers, Information Dept.
UNDERGROUND EXTENSION GROUP
Underground Service Div., Distribution Div.
Conduit Construction, Distribution Div.
Draftsmen, Distribution Div.
Pressure Regulation Div., Distribution Div.
Conduit Div., Street Dept.
High-Tension Cable Div., Street Dept.
Low-Tension Cable Div. Street Dept.
VEHICLE OPERATORS GROUP
Electric Vehicle Operators, Transportation Dept.
FIRST GRADE LINEMEN GROUP
First grade Linemen, Street Dept.
Second Grade Linemen, Street Dept
Troublemen, Street Dept.
Foremen, Street Dept.
Overhead Troublemen, Customers Service and Repair Dept.
THIRD GRADE LINEMEN GROUP
Third Grade Linemen, Street Dept.
Ground Men, Street Dept.
NEW-BUSINESS GROUP
Lighting Salesmen, Contract Dept.
Power Salesmen, Contract Dept.
House-Wiring Estimators, Contract Dept.
Interior Wiring Foremen, Construction Dept.
Inspectors, Inspection Bureau
City Inspection Distribution Div.
Installation Records, Distribution Div.
CUSTOMERS SERVICE AND REPAIR GROUP
Area and Sign Div.
Inside Repairmen
Customers Service and Repair Dept.
METER INSTALLING, TESTING AND READING GROUP
Meter Installation, Customers Service and Repair Dept.
Turn-On Men, Customers Service and Repair Dept.
Meter Inspectors, Meter Dept.
Special Reading Inspectors, Meter Dept.
Meter Readers, Meter Dept.
Outside Meter Testers, Meter Dep
Inside Meter Readers and Instrument Calibrators, Meter Dept.
MERCHANDISE SALES GROUP
Accounts Payable, Auditing Dept.
Clerical Force, Stores Dept.
Appliance Salesmen Contract Dept.
Clerical Force, Purchasing Dept.
Heating Appliance Div., Customers Service and Repair Dept.
Mercantile Dept., Treasury Dept.
Office Force, Advertising Dept.
Salesmen, Edison Bldg., Elec. Shop
Salesmen, Ry. Ex. Bldg. Elec. Shop
Salesmen, General Sales Div.
SUPPLY GROUP
All employees of Stores Dept.
Transportation Dept.
Purchasing Dept.
Mercantile Div., Treasury Dept
General Merchandise Sales Dept
Stockmen and Drivers of Lamp Renewal Dept. and Lamp Stohing Dept.

Organization Chart of Group Meetings Committee, Commonwealth Edison Company Section, N. E. L. A.

COMMERCIAL PRACTICE

New-Business Methods, Policies, Rates and Kindred Central-Station Matters for the Man Engaged in Selling Electricity

Division of Expense in Changing to Alternating-Current Service.

A friendly controversy between the management of a motion-picture theater and the Waterbury (Conn.) Central-Station Company bade fair to lead to a hearing before the Connecticut Public Utilities Commission. The question was one as to the division of expense for changes necessarily resulting from the company's abandonment of direct-current service. The theater management desired a rotary converter installed to provide the desired energy. The company desired to install another type of apparatus involving less outlay.

A. J. Campbell, manager of the lighting company, points out that in the general change-over to alternating-current service, it has been the practice to pay a large part of the cost of replacing new apparatus. For old equipment abandoned, the company bore about 50 per cent. The company expects to compromise the issue without hearing.

New Industrial Power Installations in Massachusetts.

The Milford Iron Foundry has added 83 horsepower in motors to its equipment, making about 200 horsepower in all. Service is furnished by the Milford Electric Light & Power Company.

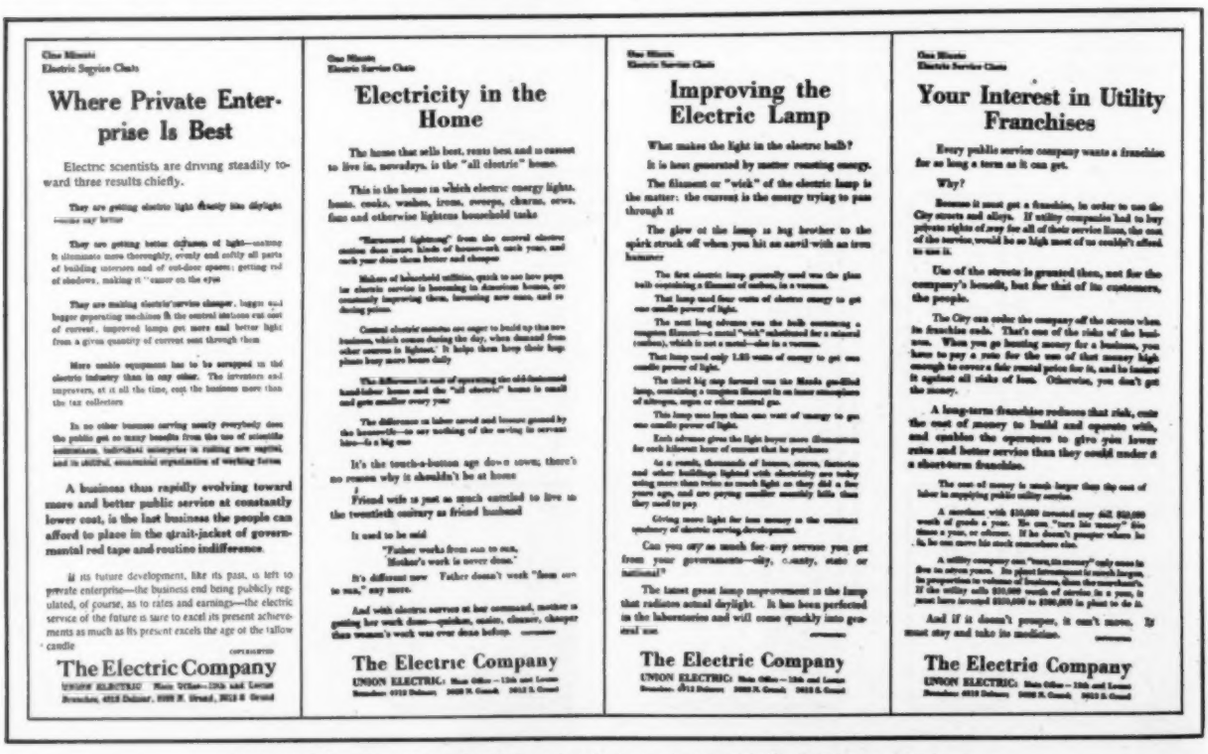
At Adams, Mass., the Berkshire Hills Paper Company has installed a 200-horsepower motor loaned by the Adams Gas Light Company, for temporary use until a new motor can be delivered. The mill has always depended on its own steam plant for power and lighting, but the breakdown of one steam engine necessitated looking to the central station for service. Energy is taken off a high-tension line connecting Adams with North Adams.

The Spencer (Mass.) Wire Company has added a number of motors for factory operation, making a total of 190 horsepower, and will add 100 horsepower more.

Union Electric Light & Power Company of St. Louis in One-Minute Electric Service Chats.

The Union Electric Light & Power Company, of St. Louis, is publishing a series of advertisements which are termed "One-Minute Electric Service Chats," dealing with various phases of public utility operation and with the various classes of service which it supplies. In the accompanying illustration are shown several advertisements of this series which have attracted considerable attention.

In another advertisement dealing with the subject of "Electricity and the Merchant," the company deals in a very interesting manner with store lighting. "The first item a lighting expert considers when called to plan electric lighting for a store is the plane of illumination," says the advertisement; "In a furnishing-goods store the plane of illumination is at the counter level, in a shoe store at or near the floor level, in a department store at the level of the showcases." The advertisement points out that these points must be given consideration if the proper system of illumination is to be installed. Reference is also made to show-window lighting and exterior decorative lighting.



One Minute Electric Service Chats

Where Private Enterprise Is Best

Electric scientists are driving steadily toward three results chiefly.

They are getting electric light cheaply like daylight

They are getting better diffusion of light—making it eliminate more thoroughly, evenly and softly all parts of building interiors and of out-door spaces; getting rid of shadows, making it "easier on the eyes"

They are making electric service cheaper, bigger and bigger operating machines fit the central stations run out of current, improved lamps get more and better light from a given quantity of current sent through them

More usable equipment has to be scrapped in the electric industry than in any other. The inventors and improvers, at it all the time, cost the business more than the tax collectors

In no other business serving nearly everybody does the public get so many benefits from the use of scientific continuous, individual enterprise in risking new capital, and in skilful, economical organization of working forces

A business thus rapidly evolving toward more and better public service at constantly lower cost, is the last business the people can afford to place in the strait-jacket of governmental red tape and routine indifference.

If its future development, like its past, is left to private enterprise—the business end being publicly regulated, of course, as to rates and earnings—the electric service of the future is sure to excel its present achievements as much as its present excels the age of the tallow candle

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The Electric Company

UNION ELECTRIC Main Office—13th and Locust Branches, 4618 Delmar, 3009 N. Grand, 3612 S. Grand

One Minute Electric Service Chats

Electricity in the Home

The home that sells best, rents best and is easiest to live in, nowadays, is the "all electric" home.

This is the home in which electric energy lights, heats, cooks, washes, irons, sweeps, churns, saws, fans and otherwise lightens household tasks

"Increased lightening" from the central electric station does more kinds of housework each year, and each year does them better and cheaper

Makers of household utilities, quick to see how page, an electric service is becoming in American homes, are constantly improving them, lowering new ones, and reducing prices

Central electric stations are eager to build up this new business, which comes during the day, when demand from other centers is lightest. It helps them keep their huge plants busy many hours daily

The difference in cost of operating the old-fashioned hand-labor home and the "all electric" home is small and gets smaller every year

The difference in labor saved and leisure gained by the housewife—to say nothing of the saving in servant hire—is a big one

It's the touch-a-button age down town; there's no reason why it shouldn't be at home

Friend wife is just as much entitled to live in the twentieth century as friend husband

It used to be said

"Father works from sun to sun,
Mother's work is never done."

It's different now Father doesn't work "from sun to sun," any more.

And with electric servants at her command, mother is getting her work done—quicker, easier, cleaner, cheaper than woman's work was ever done before.

The Electric Company

UNION ELECTRIC: Main Office—13th and Locust Branches: 4618 Delmar, 3009 N. Grand, 3612 S. Grand

One Minute Electric Service Chats

Improving the Electric Lamp

What makes the light in the electric bulb?

It is heat generated by matter resisting energy.

The filament or "wick" of the electric lamp is the matter: the current is the energy trying to pass through it

The glow of the lamp is big brother to the spark struck off when you hit an anvil with an iron hammer

The first electric lamp generally used was the glass bulb containing a filament of carbon, in a vacuum.

That lamp used four watts of electric energy to get one candle power of light.

The next long advance was the bulb containing a tungsten filament—a metal "wick" substituted for a mineral (carbon), which is not a metal—also in a vacuum.

That lamp used only 1.25 watts of energy to get one candle power of light.

The third big step forward was the Mazda gas-filled lamp, containing a tungsten filament in an inert atmosphere of nitrogen, argon or other neutral gas.

This lamp uses less than one watt of energy to get one candle power of light.

Each advance gives the light buyer more illumination for each kilowatt hour of current that he purchases

As a result, thousands of homes, stores, factories and other buildings lighted with electricity are today using more than twice as much light as they did a few years ago, and are paying smaller monthly bills than they used to pay

Giving more light for less money is the constant tendency of electric service development.

Can you *say* as much for any service you get from your government—city, county, state or national?

The latest great lamp improvement is the lamp that radiates actual daylight. It has been perfected in the laboratories and will come quickly into general use.

The Electric Company

UNION ELECTRIC: Main Office—13th and Locust Branches: 4618 Delmar, 3009 N. Grand, 3612 S. Grand

One Minute Electric Service Chats

Your Interest in Utility Franchises

Every public service company wants a franchise for as long a term as it can get.

Why?

Because it must get a franchise, in order to use the City streets and alleys. If utility companies had to buy private rights of *way* for all of their service lines, the cost of the service, would be so high most of us couldn't afford to use it.

Use of the streets is granted then, not for the company's benefit, but for that of its customers, the people.

The City can order the company off the streets when its franchise ends. That's one of the risks of the business. When you go loaning money for a business, you have to pay a rate for the use of that money high enough to cover a fair rental price for it, and to insure it against all risks of loss. Otherwise, you don't get the money.

A long-term franchise reduces that risk, cuts the cost of money to build and operate with, and enables the operators to give you lower rates and better service than they could under a short-term franchise.

The cost of money is much larger than the cost of labor in supplying public utility service.

A merchant with $10,000 invested may sell $50,000 worth of goods a year. He can "turn his money" five times a year, or oftener. If he doesn't prosper when he has he can move his stock somewhere else.

A utility company can "turn its money" only once in five or seven years. Its plant investment is much larger, in proportion to volume of business, than the merchant's. If the utility sells $10,000 worth of service in a year, it must have invested $250,000 to $300,000 in plant to do it.

And if it doesn't prosper, it can't move. It must stay and take its medicine.

The Electric Company

UNION ELECTRIC: Main Office—13th and Locust Branches: 4618 Delmar, 3009 N. Grand, 3612 S. Grand

Series of Service Chats Published by Union Electric Light & Power Company.

Christmas Advertising of Texas Power & Light Company.

The accompanying illustration shows an attractive card which the Texas Power & Light Company, Dallas, Tex., sent

Attractive Christmas Card of Texas Company.

out to all of its customers on January 1, 1917. The card is modeled after the poster used by the Society for Electrical Development to advertise America's Electrical Week.

Many favorable comments have been received on the general design.

Maine Company Makes Rapid Growth.

One of the most successful and enterprising central-station companies in New England is the Central Maine Power Company, whose head office is at Augusta, the capital city. This company has been acquiring electric light plants in smaller cities and towns of the central portion of the state in rapid succession, until now it serves 62 communities and carries over 25,000 service accounts. Its transmission lines are more than 400 miles in extent. During the past year the company used more than one million feet of wire for interior wiring alone.

By the opening of a new high-tension line linking Bath with the system, the whole Kennebec valley is served, from Greenville, near Moosehead Lake, to the sea coast.

Extension of Lines to Serve Farmers in Northwestern Ohio.

Farmers living adjacent to the lines of the Northwestern Ohio Railway & Power Company, which operates in a number of municipalities in the vicinity of Toledo, O., are showing a growing disposition to light their homes electrically and use electric power. It is the custom for a number of adjacent property owners to sign agreements to use the service, so that the company has a basis for determining the possible revenue before building extensions.

MERCHANDISING OF ELECTRIC APPLIANCES.

Some Statistics On the Sale of Household Devices by Central-Station Companies.

In justification of the policy on the part of central-station companies of selling appliances, Hudson W. Reed, of the firm of Day & Zimmerman, operating engineers, presented some interesting data before a recent convention of central-station representatives in Pennsylvania. The data, it was stated, were obtained from reports of operating companies in the state, and applies, undoubtedly, in only those communities where merchandising activities on the part of dealers is not what it should be.

Discussing the need for placing electrical appliances on the lines, Mr. Reed says that when it is considered that the average revenue derived from residential customers is decreased each year by the more extensive use of high-efficiency lamps and that each new customer taken on increases the interest, depreciation and operating charges in almost direct proportion to the additional revenue, it is obvious that the central station's only hope of increasing its revenue from connected residential customers is in the increased use of appliances. Practically the only additional cost incurred by the central station for increased revenue from this source is the cost of generation, whereas a new residential customer involves a service charge of from 40 to 80 cents per month, depending upon the method used for spreading operating costs to classes of customers.

The data furnished by various companies show that from $4 to $16 (average $12) is spent in securing each new residential customer or, looking at it from another viewpoint, from 22 to 90 cents is spent for each dollar of increased residential revenue per annum, based on an average income of $18 per customer per year.

Estimate the service charge (exclusive of production costs) at 60 cents per month or $7.20 per annum and the production costs at $3 per year, it will be seen that the total cost the first year for the average residential customer (excluding taxes, depreciation and interest) will be:

New business cost	$12.00
Service cost	7.20
Production cost	3.00
Total	$22.00

At an estimated revenue of $18, the first year's installation will show a deficit of $4.20 and when all fixed charges are considered the revenue will not reach the total charges until the third year.

With the cream of the residential business already secured, the central station has but two chances to increase its revenue from residential customers:

(1). The working out of a practical and economical method of handling small customers.

(2). Increasing the revenue from present customers by inducing greater current consumption through the use of appliances.

Electric appliances seem to fall into four distinct classes from the standpoints of merchandising, production of revenue and desirability to the housekeeper, as follows:

(1). Low-priced appliances such as flat irons, toasters, grills, portable lamps, utility motors, percolators, fans, etc. These have become essential to modern housekeeping and bring in a consistent revenue which the average residential customer can pay.

(2). Low-priced appliances such as heating pads, curling irons, chafing dishes, vibrators, etc., which are not essential to the average family and bring in very little revenue.

(3). High-priced appliances such as washing machines, dish washers, vacuum cleaners, etc. Little revenue is derived from the use of these appliances, but they tend to hold customers, as the housewife who possesses one is not apt to move into an unwired house and lose the benefits of doing her work electrically.

(4). Electric ranges and water heaters.

There is no doubt that the central station can afford to sell some of these appliances at cost or even at a loss.

It has been shown that for each estimated $1.00 of revenue secured from the average new residential customer whose home is on the existing lines 57 cents new-business expenditure is required. Based on this cost, the central station can afford to expend $4.56 for the selling of an appliance that will bring a revenue of $8 per year, and still save the $7.20 service charge of an additional customer.

Treating the selling cost on this basis, a Pennsylvania central station recently sold 2,500 irons at $1.50 per iron and considered the loss between the selling price and the total cost delivered to the customer as a well spent new-business investment.

Herewith is tabulated the details entering into the transaction:

Twenty-five hundred irons @ $1.80 each	$4,500.00
Advertising	80.00
Delivery	35.00
Total expenses	$4,615.00
Received from sale——$1.50 each	3,750.00
Net loss from sale	$ 865.00
Estimated revenue—$6.00 each	$15,000.00
Cost per $1 additional revenue	.058

The advantage of such a sale is shown conclusively by comparing the unit cost of $0.058 per $1.00 of increased revenue with the 57 cents per $1.00 of additional revenue from new residential customers' cost.

Assuming that the cost of generating the current consumed is one cent per kilowatt-hour delivered to the customer's meter and the rate is six cents per kilowatt-hour, then the expense of serving the customer who purchased an iron was $1.00 for energy plus the merchandising loss of 38 cents or a total of $1.38 for the first year.

With a revenue of $6.00 per iron, the operating ratio for the new business taken on through this sale is 23 per cent, which is considerably less than the total operating ratio.

Other utility appliances which are considered good revenue producers are listed in the first class of appliances. Far too little attention has been given to the sale of percolators. These have been treated by the commercial men as a household luxury, whereas they are really a refinement of a household necessity. The diversity-factor of percolators is far better than that of irons, as they are used at different periods of the day throughout the week.

Portable lamps and candlesticks, while not strictly electric appliances, can be treated as such and are very good revenue producers. A careful study of their use shows that a room containing a portable lamp is generally illuminated whether in use or not, while rooms not containing them are generally in darkness when not in use.

The appliances mentioned together with toasters, grills, fans and utility motors can be sold below cost and yet produce greater profit to the central station than new residential lighting customers. On the other hand, chafing dishes, vibrators, heating pads, tea samovars, curling irons and like appliances are not used to a large extent and are sold more for the customer's convenience or ornamental effect, and this class of appliances should be sold at list prices to help carry the overhead cost on the appliances listed in the first class.

Furthermore, sales of appliances in the second class are infrequent, very often requiring the central station to carry them in stock for a long time and it would be unwise to sell them without a profit.

The sale of the third class of appliances of which washing machines, dish washers and vacuum cleaners are the most prominent, is very desirable. Terms can be made on the deferred-payment plan, so that they are within the reach of a large per cent of residential customers. Too little attention has been given to the sale of these articles. They are consistent current users, and while the revenue derived may be small, the solution is a greater sale of them. They are invaluable for retaining customers, because a customer possessing either of these appliances will not move into a house that is not wired unless assurance has been given by the landlord that it will be done. As the sale price of a vacuum cleaner or washing machine is much higher than that of an iron or grill, the profit should not be based on a percentage basis, but rather on a fixed amount. The central station can afford to make the sale on a small profit, since these appliances tend to make satisfied customers, as they eliminate the worst features of household drudgery at a small current cost.

HELPING CENTRAL-STATION SALESMEN.

Manufacturer's Booklet Gives Valuable Data for Benefit of Appliance Salesmen.

When a central station decides on a house-to-house appliance campaign, one of its biggest problems is that of obtaining salesmen. Electric-appliance canvassers are not found drifting about, and it is, therefore, necessary to build them out of the best available material.

The usual procedure is to advertise for agents or canvassers and to pick the best salesmen out of those who apply. One crew manager, who has successfully managed a large number of central-station campaigns, characterizes the average green crew of canvassers, as a "Bunch of Burglars," and he ought to know.

This green crew must be educated, to make electrical salesmen out of them. Talks by the crew manager, sales demonstrations, daily or weekly experience meetings, these and many other means are used by experienced crew managers, each having his own particular method of instruction.

It has been found that one of the hardest things to be done is that of educating a crew of canvassers in properly using catalogs. However, most manufacturers' catalogs are made to give all the information necessary, and also contain a good deal that is not required by the canvassers in selling the appliances. For this reason, the Westinghouse Electric & Manufacturing Company has recently published a folder entitled "A Handbook for Solicitors."

Five pages of the handbook are taken up with general sales arguments and pointers to salesmen, which are worth studying and remembering to make the best showing. Page 5 in particular gives a number of minor points, often overlooked by the average canvassers, which have been found to be of extreme importance. These are:

Always carry and leave a personal business card.

A user of an iron is a first-class prospect for some other device.

Spend half your call in explaining your device and the other half in getting the order signed.

Close your sample case while making a demonstration. This concentrates attention on what you are showing.

Don't mention price the first time asked—go on with your demonstration.

If asked a second time, a sale is pretty sure—stick for the order.

Make return calls in the evening if prospect wants to consult her husband—don't call the next day to see what he said—sell him yourself.

Don't leave articles on trial—it means double or triple work. Sell outright with absolute guarantee.

On Monday, Tuesday and Wednesday, call at the back door; on Thursday, Friday and Saturday at the front door. This rule may vary with the neighborhood.

Rainy days are good days for industrial and apartment house calls, tailors, dentists, downtown—women don't want their rugs soiled.

Always ask prospects if they are satisfied with the company's service.

Turn in all complaints and see that they receive attention.

Advancement depends upon results. Best results from a central-station viewpoint are those that build up the day load. This handbook is designed for use by progressive central stations about to start a canvassers' campaign, one for each canvasser employed.

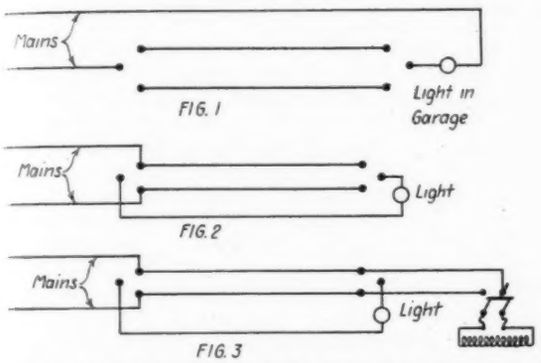
ELECTRICAL CONSTRUCTION

A Department Devoted to Problems Relating to the Installation, Operation and Maintenance of Electrical Equipment

Additional Loading of Circuit Without Interfering with Intermediate Three-Point Switch.

By Paul Justus.

Lights to be controlled from two locations by means of three-point switches may be wired according to either of the methods shown in Fig. 1 and Fig. 2. A wireman was called in to install a light in a private garage to be controlled both from



Putting An Automobile Engine Heater on Garage Circuit Without Interfering with Three-Point Switches.

the owner's home and from the garage. Being familiar with only the scheme shown in Fig. 1, the wireman installed the light accordingly and the arrangement worked quite satisfactorily.

Later in the fall the owner decided to install an electric heater in the garage, the heater to be left on all night, and this not interfere with the operation of the light. On calling on the same wireman, the owner was advised that this could not be done without interfering with the control of the light or else running another wire between the house and the garage. The owner gave up the idea for the time being.

However, on mentioning the incident some time later to a friend, he was advised that it could be done with merely the installation of a double-pole single-throw switch for throwing the heater on or off, and the necessary changes in the wiring to make it conform to the arrangement shown in Fig. 3. Upon showing this to the wireman, the latter agreed that it could be done without an additional wire, and proceeded to make the changes indicated. The scheme has worked perfectly. Its use frequently will be found to come in handy for various purposes.

Wiring of Steamboat Annunciators to Insure Quiet Operation at Night.

By George R. Strombom.

The location of annunciators aboard steamboats, particularly those having from 300 to 500 staterooms and where the travel is exceedingly heavy, has in the past received very little consideration. The products of the past two years in steamboat construction have shown great improvement in this respect, inasmuch as they are generally equipped with a special annunciator room, instead of having the annunciators located in various parts of the saloon as is common in older boats.

Aboard most steamboats it is customary at 10:30 p. m. to turn out most of the lights, leaving only the night lights burning, and at this hour the passengers expect and, by the rules of the company, can demand quiet.

With the annunciators located in the saloon there is almost a continuous ringing for the hallman from various parts of the boat, and after 10:30 p. m. this has proven to be a nuisance to the traveling public.

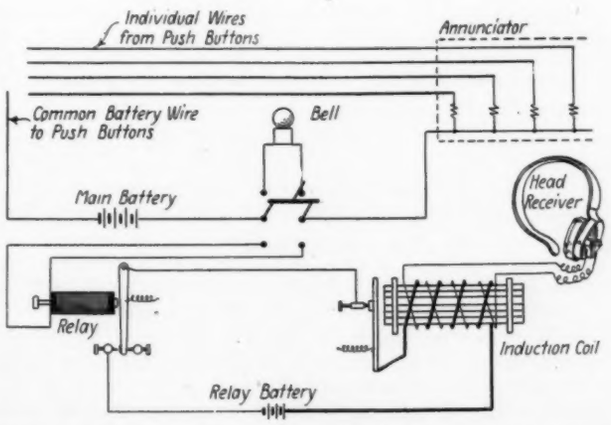
I have in my charge a number of steamboats, having from 300 to 500 staterooms, which were built a number of years ago and which have the annunciators located in the saloons. After having been informed of the many letters of complaint received by the manager, I abolished the use of bells and installed buzzers in their stead. This proved to be almost as unsatisfactory as the bells, so I had quite a problem to work out, and that without delay.

It was necessary to devise something that would attract the attention of the hallman at the annunciator, whether he be reading or sleeping, yet which would not disturb the passengers even in the staterooms nearest to the annunciator. Various ideas came to my mind, but of them all there was but one that I found to answer the purpose in all aspects.

In the line between the batteries and annunciator bell I cut in a double-pole, double-throw switch. The upper position of the switch I used when it was desired to make use of the bell, which we did until 10:30 p. m., at which time the switch was thrown over into the lower position. This cut in the relay and induction coil with its secondary connected to a telephone head receiver.

This head receiver gives the hallman on watch a good alarm and, should he have fallen asleep, serves as an excellent method of waking him. Still not the slightest sound can be detected by anyone but the man using the receiver.

The relay and induction coil I installed in the engine room, so as to have it as far away from the saloon as I



Change-over Arrangement from Bell to Telephone for Steamboat Annunciator.

practically could; the noise of the interrupter on the coil would then not be heard even in the slightest degree.

This arrangement was used with much success and I have not to this present day experienced any trouble with it, save the renewing of batteries every season.

Compensation for Estimates and Bids

Mr. Hill's Second Article on This Timely Subject, Continuing the Discussion in the Last Issue and Showing How the Nelson Form for Choosing Bidders and Awarding Contracts Is Already Working Out an Equitable Solution of the Problem

By GEORGE W. HILL

PERHAPS one of the most perplexing problems with which the contractor has to deal is how he may justify the expense he must charge to the jobs he does receive, which has been incurred in submitting estimates and bids on jobs he does not receive, and which he possibly never felt that he had a chance to receive. This has been recognized to be one of the greatest evils existing in the general or sub-contracting business. It amounts to furnishing personal advice and professional services without compensation.

If we are to add this expense to our overhead or general operating expense account, which is where it belongs, we are then charging to the jobs we do receive an amount expended in providing owners and architects with information and competition on jobs we do not receive, and many of which it was never intended for us to receive.

It is the writer's contention that owners and architects should pay for any competition which they may require in an effort primarily on their part to learn the amount of money which will be required to erect a building or any other piece of construction work. This is especially true since we find that in nearly all specifications there is a clause underlined, printed in bold-faced type or in red ink, so it may not escape our notice, "Any and all bids may be rejected." We are being told as plainly as can be that we may be rendering any amount of professional services for nothing. Here we find a large number of contractors giving the owner the benefit of all their personal knowledge, data and information gained in years of too often hard experience in business, the brains and talents of cost accountants, bookkeepers, stenographers and engineers, all *gratis,* with no assurance that any of them may receive one cent of compensation for their work and trouble, traveling in some instances many miles in order to be on hand to hear the statement, "The architect's estimate was too low or you are all too high." The writer recalls instances in his personal experience where the owner and architect even overlooked the little courtesy, "Thank you, gentlemen."

Lack of Equity in Present Bidding Practice.

Under the present method this is all gratis so far as the contractor is concerned. He has shown the owner and architect the probable cost of construction, and with no assurance that he will receive one cent for all of his trouble and money expended. Now the only thing he can possibly do is to add this expense to his overhead or operating expense column and distribute it through his entire business for the year, adding a little to each estimate in an effort to reimburse himself for this expense.

It is, therefore, contended that the owner, architect and contractor would be equally and jointly benefited if some reasonable and equitable arrangement were to be consummated whereby each individual job should bear its own competition expense. In other words, all owners and architects should be entitled to all the competition they are willing to pay for. This would seem a most equitable arrangement and should recommend itself to all thinking people. It is true that if by the adoption of such a method it was found to work an injustice to any one concerned, it could not and would not stand. On the other hand, if it were found to be equitable and there still existed laws and obstacles to prevent its operation, then such laws and conditions should be removed or repealed and the contractors of the country should, in the opinion of the writer, experience no difficulty in securing the hearty co-operation and support of legislative bodies, owners and architects in bringing about a condition wherein all may be benefited.

Cannot Expect Professional Service Without Compensation.

There is a possibility that some may think that this cannot be done under the law. The contention is, therefore, clearly made in reply to this, that contractors, estimators or engineers, individually or collectively, cannot be compelled to render professional services without compensation, so long as they do not do anything which would be considered "in restraint of trade." Some have the idea that legislation compelling owners and architects to pay for competition would be essential and desirable, but the writer contends that this is not necessary because, under existing laws, he may refuse to render professional services without compensation.

It is the opinion of many that any set of contractors, any local, state or national association, may adopt a fair, definite and standard form of procedure on this matter, and that they cannot possibly be doing an injustice to each other, the owners or architects, or any one else concerned. Very much to the contrary, they would be dealing with themselves and their customers in a most honorable and equitable manner. Do you not presume on a moment's thought that any owner would be willing to pay a reasonable amount for competition on his particular job when he comes to know that otherwise he is paying for competition which other owners have received from the contractors, provided that the latter in bidding recognize the most important item of operating expense? If he is not business man enough to know that all costs must be considered before an intelligent selling price may be set, he certainly would not be considered a desirable contractor and there would be some question as to his performing the work correctly, even if it was awarded to him.

Poor Business Policy in Present Practice.

The usual practice is to prepare a quantity survey and labor estimate and to this add the percentage of overhead or operating expense, which contains, or should contain, all general operating costs, and on top of this figure add a reasonable profit. The great trouble with many contractors is that they do not get this estimating and bidding expense into the overhead columns, and they are simply giving away to anybody who wants it thousands of dollars annually.

I assume, if out of pure curiosity I desired to learn what it would cost me to erect a certain structure, with no intention whatever of ever having the work done, that on a structure of approximate cost of $10,000 I could, without much difficulty on my part, cause the contracting fraternity to spend as much as $2,000 in furnishing me with the information, and I could then fall back on the clause, "The owner reserves the right to reject any and all bids." This $2,000 would go to increase the operating expense of the contractors and the fellow who really did desire to build and who did build would find that he had paid for this

information which I had received. Therefore, the writer contends that the owner would be benefited more than the contractors, if an equitable form of procedure should be adopted.

Another injustice which prevails in the present method is that too many bids are submitted to establish an intelligent estimate of the cost. It is not uncommon to find on an average $20,000 job that the highest bid is $24,000 and the lowest bid about $16,000, a difference of $8,000, and any owner would necessarily conclude that there was something "wrong in Sweden." If plans and specifications were handed to, say, four contractors of known reputation who were to receive compensation for estimating and bidding, would not the owner receive a much more reliable and comprehensive idea of what the cost to him would be than if the plans and specifications were to be scattered broadcast? Would not the owner, as a matter of fact, desire to give this job to the contractor who was somewhere near the average of all bids rather than to the lowest bidder, who may not be reliable? It is the rule, rather than the exception, that contractors who are always low are unreliable and are more or less inclined to be tricky. As a rule, such a contractor will bear any amount of watching, for while he may or may not at first know that he has submitted a bid much too low, he soon finds it out and usually so does the owner or architect, and from that time on he burns midnight oil in an attempt to find something in the plans and specifications which will permit him to misinterpret them and skin the job or run up a bill of extras often times amounting to sufficient to cause the owner to pay more than the price asked by the highest bidder.

Fallacy of Seeking Cheapness Alone.

Do our best business men send their boys to the cheapest shoe store in town to buy their shoes? Do they themselves look up all the Cheap John merchants in the community and patronize them? Do they, when requiring the professional services of a physician, look up the poorest and cheapest quack in town? No! Then why do they insist upon receiving figures and professional services for the construction of their homes or business buildings from some chep-screw, no-good, brainless, would-be contractor; they do not desire him to build the house. No, they do not dare to give him the job, for if they should, they would have visions of mechanics' liens, labor troubles, law suits, and many other undesirable things.

But many of them will sit and look you squarely in the face and never bat on eye while they tell you they like you. They want to see you do well and just in order to help you along they are going to tell you that they have a still lower bid. They are helping you along, but along toward the poorhouse rather than a brown stone front on some fashionable residence street. If they were compelled to pay for competition, this unscrupulous, no-good, "dub" contractor would not be invited in.

It is, therefore, contended that the practice of demanding compensation for competition would have a tendency to eliminate this undesirable element, and just as soon as the public came to know the benefit to them the cheap-screw contractor would be looking for a job working for some good, reliable man who believed in uplifting and upbuilding the business, and they would both be better off.

Nelson Form for Choosing Bidders and Awarding Contracts.

H. W. Nelson, of Moline, Ill., now president of Moline Heat, has for over 20 years been closely allied with contracting and has given this subject more thought perhaps than any other man in this country. He has produced a form entitled "The Nelson Form for Choosing Bidders and Awarding Contracts," which is, in the opinion of the writer, a master stroke in curing many ills in the contracting business. It is without a doubt the most comprehensive document ever produced for the contractor. It is, in fact, a most wonderful production, showing from beginning to end the most thorough knowledge of the subject, and indicating a most unselfish nature in its author as will be readily understood upon reading this form that it is the result of untiring efforts for years which are practically given to the contracting world gratis.

The Quad City Builders' Exchange, an organization of contractors in the cities of Davenport, Iowa; Rock Island, Moline and East Moline, Ill., has adopted the Nelson form with the most gratifying results, and it has received the hearty co-operation and support of the architects of the four cities. E. J. Burns, secretary of the Quad City Builders' Exchange, whose office is in the Safety Building, Rock Island, Ill., is a most enthusiastic advocate of the Nelson form and delights in speaking with any one interested in this subject.

In the report of the committee of the Quad City Builders' Exchange which considered the subject and submitted the resolution that brought about the adoption of the Nelson form by members of the Exchange, there occurs this significant paragraph:

"After careful consideration, this committee concedes the correct principles and sound reasoning embodied in 'The Nelson Form for Choosing Bidders and Awarding Contracts,' of which Mr. Herman W. Nelson, of Moline, Ill., is the author. All members of this Exchange have been furnished a printed copy of this form. It is the further belief of your committee that said form can and should be brought into practical and universal use, and that its adoption will tend to eliminate most, if not all, of the evils now existing under the useless and wasteful competitive methods generally practiced; that the form is unquestionably fair to all parties involved in any competition; that because of the demand on the part of the bidders for compensation, the competition will as a consequence be reduced to a reasonable and meritorious basis. That the bidder who at present deems it necessary to bid on a *price basis only*, will soon find it to his interest to give consideration to other factors and thereby better the character of his work and service; likewise the buyer who persists in the pernicious practice of allowing bidders to compete *solely for the purpose of 'dickering' with the bidder he intends to favor*, will soon find it more costly than he can afford."

The advice of the writer, in his constant effort to do his mite in bettering conditions among the contractors, would be to secure a copy of this form with explanatory matter, study it carefully, and present it to your local, state and national association for adoption, for of the various solutions presented for this troublesome problem of estimating and bidding Mr. Nelson's is the most thoughtful and comprehensive. There can be no doubt that you will be impressed by the soundness of his reasoning and the fairness and equity he shows to all concerned.

Electrical Features of Gymnasium at Phillips Exeter.

The new gymnasium and swimming pool of the Phillips Exeter Academy at Exeter, N. H., contains some interesting electrical features. Fourteen motors are installed in connection with water-circulating and ventilating systems. The swimming pool, 25 by 75 feet, is supplied with water and exhausted by means of pumps driven by 12 electric motors of 1.5 to 5 horsepower rating.

The lighting consists of 40 to 750-watt incandescent lamps. All lamps over 75 watts are type C Mazdas.

Over the gymnasium hall are 12 750-watt nitrogen-filled lamps, which are protected by wire mesh against baseballs or other missiles. The lamps are installed from the roof girders on 0.5-inch pipe. The contractor for the electrical work was Barnes-Pope Electrical Company, Boston.

Nelson's Form for Competitive Bidding

Full Text of "The Nelson Form for Choosing Bidders and Awarding Contracts"* Under the Competitive System Where Two or More Bidders Are Invited to Compete

By H. W. NELSON

ESTIMATING costs and establishing prices is an overhead expense involved in any merchandising, but the cost of doing so is generally nominal if not insignificant and can be justifiably distributed. The cost of figuring or estimating work to be performed in accordance with special specifications to meet each case, however, differs materially from establishing a price on each of a thousand hats all made from the same material and from the same pattern; therefore, this form is suggested to meet special conditions, to more justly distribute the cost of competition and estimating, and to make each project bear its own proportion of the cost.

SOLUTION OF A SERIOUS PROBLEM.

This form, prepared by Mr. Nelson after very careful study of the situation from all angles, is probably the most comprehensive solution of inequities of present competitive bidding yet presented.

It has already been adopted by organizations of builders and architects.

It is published here, both with its introduction and actual rules, in the hope that electrical contractors throughout the country will give it thorough study and consider its adoption by their organizations.

It is submitted with the thought that there are three main factors entering into the relations between the purchaser and the seller, viz.:

1—Quantity and quality of materials.

2—Character of labor and personal service.

3—Price to be paid for both.

The first factor can be determined and somewhat *definitely* set forth in the form of plans and specifications to be furnished by the purchaser to the seller, upon which the seller can base his price.

The *character of the labor and personal service* rendered by the seller or expected by the buyer varies as much as human nature varies and *cannot be so definitely or exactly* set forth.

The *price*, or third factor, can be based *definitely* upon the materials, but must necessarily vary upon the personal service, depending upon the value placed upon it by either the seller or the buyer.

Therefore, the purchaser should be allowed to exercise his recognized personal liberty in choosing the party with whom he wishes to enter into a contract; basing his choice upon price, his own confidence in the seller, his own judgment of the seller's qualifications or experience necessary to render the service he wants, or any other factor that he may himself consider most important.

And when the purchaser desires competition to enable him to make comparisons or decisions based upon a combination of all three factors, competition which involves labor and expense on the part of the seller, then the purchaser shall *purchase* that *competition* at a fair and just price, just as he purchases anything else.

The author respectfully asks the reader to consider, first, the author's recognition of the fact that there can never be an end to all evils; that the author is fully aware that this proposed form can be and may be improved upon, and that, if the reader credits the form with any merit at all, he consider it as a "means to an end" rather than the "end" itself.

Further, that the reader in considering the form shall consider it from the standpoint of the individual that awards contracts as well as from the standpoint of the one who bids upon them, bearing in mind that if it works any injustice to either one, it cannot be correct or successful.

The author fully realizes also that no reform as suggested here can be adopted in a day, a week, or a month. There may be existing conditions or, perhaps, existing laws, preventing its immediate adoptions or use. (The author claims no authority on legal matters.) If the reform is correct, however, any laws that then prevent its use must necessarily be incorrect, and laws can be changed or improved to meet new conditions.

The author requests that you, Mr. Reader, accept this form only as his conscientious efforts towards a remedy for existing abuse of present methods, if not the methods themselves, which in his opinion, are unnecessarily most severe not only upon competing bidders but also upon the buyer, his architect or engineer, who is frequently and unjustly accused of grafting or discriminating unfairly, or otherwise criticised when he dares to award contracts on the basis of his own honest opinion of the relative merits of the bids presented.

That, if the form in your opinion comes nearer to being fundamentally correct than any existing methods of letting contracts or more nearly approaching American ideals, or if it seems more practical for immediate adoption than other proposed reforms, such as the "Quantity System," etc., and if it does not conflict with any existing laws or conditions, that you adopt it, individually or as an organization, either as a buyer or as a seller. Under this form of choosing bidders and awarding contracts, it is the intent:

First—That the buyer may have just as much fair competition as he wishes to pay a reasonable and fair price for; that he, alone, derives the benefit of competition, and that no one buyer should pay for competition received by another—an abuse that exists under present methods.

Second—That when and after the buyer has chosen his competition in a fair, unprejudiced manner, and has further paid a just and reasonable price for said competition, he shall be under no moral or other obligation to the bidders; that he may make his own decision based upon his own opinion of the qualifications of the bidder or the bidder's price, or a comparison of both.

Third—That the buyer may, as he chooses, select a limited or large number of bidders. If the work is of a private nature, he may wish to choose a very limited number, if he wants competition at all. If the work is of a public character, he may necessarily wish to give every *qualified* public citizen bidder an opportunity to compete, but without the necessity of paying more for the competition than he may consider the competition is worth.

Fourth—If the work be of a public nature, the buyer may have good reasons for first *selecting* a limited number of bidders, because of their residence near the work to be done, or because they may be familiar with or may have had previous experience with the work, or for sundry justifiable reasons.

Fifth—That when the buyer, in case of public work, has

*Copyrighted, 1916, by H. W. Nelson, Moline, Ill. Reprinted by consent of the author. Copies of the Nelson form, with much valuable explanatory matter, are being published as an 85-page book obtainable from Glenn Smith, 1824 Third Avenue, Moline, Ill., for 50 cents a copy.

then chosen his *preferred* bidders, he may give every other *public* citizen who is *qualified* to bid an opportunity to compete by chance or lot for consideration as a bidder, limiting the number to be chosen in accordance with the value of the competition to him.

Sixth—That the bidder shall in no way be considered as an engineer, but solely in the light of a bidder and contractor capable of doing work in accordance with complete plans and specifications; and that, therefore, in every case where bidders are expected to bid in competition, they, the bidders, shall be furnished by the buyer with *plans, specifications, drawings* and *instructions* covering the work to be performed *as completely and specifically as* commercially *possible,* with sufficient details to enable a bidder to fully understand what he is expected to figure and bid upon.

Seventh—That if a buyer cannot or will not provide complete detailed plans and specifications for the work, but wants estimates, measurements, figures or advice of a professional nature, then he, the buyer, shall consider such work in the light of a *professional service,* and it shall not be considered proper, fair or just to ask for *competitive price bids,* but that the charges for *such professional service* shall be left solely and strictly for adjustment between the buyer and seller either before or after the work is done. Approximate estimates shall not be considered binding upon either party involved.

That under no circumstances shall the amount of a competitive bid be altered or the intent of the bid be changed so as to equivalently alter the amount, *after the bid has been submitted and before the contract has been let.*

That no reductions or additions shall be made in bids for the purpose of meeting lower bids or because of proposed changes in plans and specifications. That under such proposals by the buyer, either new bids based upon new plans and specifications shall be asked and paid for—or—the contract shall be let and mutually satisfactory arrangements then made between the buyer and seller. *That what is now known as "shopping" or "peddling" bids shall be discountenanced by both buyer and seller.*

Rules and Methods of Procedure.

Public Work.

Clause 1—Procuring Applicants to Bid Upon Public Work.—If the work is of a public character, it is conceded that every public citizen who is qualified to bid shall be given consideration. Therefore, the buyer shall advertise (Exhibit A)

Sample Form of Advertisement for Applicant Bidders

Dated March 1, 1916.

To All Whom It May Concern:

The Board of Education of Davenport, Iowa, will on or about May 1, 1916, award a contract for the erection of a High School Building in Davenport, Iowa, to cost approximately $200,000.00. Contracts to be let in four parts, viz.: General Building Contract, Heating, Plumbing and Wiring.

All contractors or contracting firms who may consider themselves qualified and who may desire to submit bids upon this work, are requested to file with the undersigned their application in form substantially as given below, procuring from undersigned a proper receipt for same.

Address J. V. PATTERSON, Secretary
Board of Education,
1216 Locust Street, Davenport, Iowa.

Applications must be filed on or before March 16, 1916.

Applications sent by mail must be sealed and sent by U. S. Registered Mail.

Exhibit A.

in all recognized local newspapers simultaneously for a 15-day period of time at least, setting forth that he intends to let a contract, requesting all those who wish to submit bids to file an application (Exhibit B). Such advertisement shall clearly state the *character* of the work and its location. The application from bidder (Exhibit B) shall be in the hands of

Application for Consideration as Bidder

Dated.....

J. V. Patterson,
Secretary Board of Education,
1216 Locust Street,
Davenport, Iowa.

The undersigned hereby makes application to be considered as one of the bidders upon the.....
(State character of work)
work in connection with the erection of your proposed new High School.

.....have been actively engaged in the.....
.....business for a period of.....
.....financially able to furnish any bonds or security that may be required and to carry out any contract ..... may enter into.

.....business has been confined principally to.....
(State locality in which you have done work)

If chosen as one of the bidders, ...hereby agree to abide by and conform strictly to "The Nelson Form for Choosing Bidders and Awarding Contracts" and all its intents and meanings, with which .....familiar.

Signed.....

Address.....

Note—Applicants are requested to furnish with this application any and all information they may have in printed or written form covering the work they have done and the names and addresses of references.

This application shall be sent by U. S. Registered Mail.

Exhibit B.

the buyer upon a certain date, and not less than 15 days from the date the first advertisement appears. Immediately upon receipt of the application, the applicant shall be given a receipt substantially as per form (Exhibit C).

Clause 2—Approving the Applications from Bidders.—Known incompetency, lack of experience in the class of work contemplated, insufficient organization, or insufficient capital or equivalent to carry out the contract, or unsatisfactory previous experience with applicant, shall all be considered good, just and sufficient reasons for non-consideration by the buyer and his refusal to approve the application. All other applications shall be approved and given consideration. It shall, however, be considered obligatory upon the buyer to immediately and fully state his reasons for failure to approve an applicant, if called upon to do so.

Clause 3—The Number of Bidders to Be Selected.—The minimum total number of bidders to be selected shall be de-

Receipt for Bidders' Application

Mr. John Jones, Date.....
Duluth, Minn.

Dear Sir:

Your application dated .....
to be considered as one of the bidders upon the.....
.....work in connection with the erection of our proposed.....duly received.

In selecting bidders for this work, your application shall be given careful and thorough consideration, without prejudice or favor, in accordance with "The Nelson Form for Choosing Bidders and Awarding Contracts."

Immediately after the selection of the bidders you shall be notified whether or not you have been selected.

Signed.....
.....
.....

Note—This receipt shall be sent immediately upon receipt of the application.

Exhibit C.

termined by taking the square root of the estimated net cost of the proposed contract in dollars and multiplying by 0.04, as shown (Exhibit F), or thus: If it is estimated that the contract cost will be $10,000 (the square root of which is 100) multiply by 0.04, which gives 4 as the minimum number of bidders to be selected. In case of fractions, the number nearest the next highest whole unit shall be selected. It is obvious from the intent of this form that the buyer may have as many additional bids as he may want, provided he wishes to pay for the cost of such additional competition and with the further provision that he fairly choose such additional bidders, as provided for in Clauses 4 and 5. Should it be found that the buyer, in case of public work, intentionally or unintentionally has estimated the contract more than 10 per cent lower than the lowest bid, it shall be considered good and just cause for complaint on the part of uninvited public citizen bidders, on the grounds that the buyer has kept his estimate

low so as to exclude bidders or reduce the number of bidders considered legitimate for public work under this form.

Clause 4—Preferred Bidders Selected by Buyer.—The buyer may at his discretion, or if he chooses for good and sufficient reasons to do so, select and invite one or more preferred bidders, but the number of such preferred bidders shall in no case exceed a number equal to one-half of the total number of all bidders selected. It shall, however, be obligatory in case of public work upon the buyer to immediately divulge or make public the names of such selected bidders, if requested to do so, and to give his reasons for selecting them.

Because a certain contractor is selected as a preferred bidder it shall not indicate that he is to be or shall be given preference in awarding the contract, but rather that the privilege given the buyer to select a limited number of bidders is more for the purpose of enabling him to obtain low but meritorious bids.

Clause 5—Bidders Chosen by Lot.—The remaining number of bidders to be invited after the preferred ones have been chosen (Clause 4) shall be chosen by drawing lots, thus: The names of all applicants (except those who may have been selected as per Clause 4) who have made written request upon regular form (Exhibit B) and have been approved by buyer as per Clause 2, shall be placed on stiff blank cardboards not smaller in size than one inch wide by three inches long. These cardboards, with the names of the applicants clearly

Form of Notification to All Applicants, Advising Them of the Selection

Dated.....

Mr. John Jones, Duluth, Minn.

Dear Sir:

You are hereby notified that you were..... selected as one of the bidders to bid upon the..... work in connection with the erection of..... building.

If you were selected please make immediate request for "Bidders' Agreement" and for plans and specifications. If you decide not to bid, please notify the undersigned immediately. If you are not heard from in fifteen days from date, another bidder will be chosen to substitute for you, in accordance with "The Nelson Form for Choosing Bidders and Awarding Contracts." Bids will be opened.....

Signed.....

.....

Note—This notice should be sent to all applicants immediately after bidders have been selected by U.S. Registered Mail.

Exhibit D.

written or printed upon them, shall be placed in any convenient opaque receptacle not less than five inches deep, closed on all sides and bottom, but open at the top. Then a totally disinterested or blindfolded party shall draw from said receptacle a number of cards, no more nor less than the number of bidders to be chosen by lot. The names of the applicants appearing upon the cards drawn shall be duly selected as bidders. This drawing shall be at all times open to the public or interested applicants.

Clause 6—Notifying Bidders and Bidders' Agreement.—When the required total number of bidders have been chosen, all applicants shall be notified on forms substantially as shown in Exhibit D. The applicants who have been selected to bid shall then be given all necessary plans, specifications, drawings and instructions. They shall also be given a "Bidder's Agreement," substantially as shown in Exhibit E. These plans and the "Bidders' Agreement" may be handed to bidders in person or sent to them by United States registered mail, and no contracts shall be let or bids opened, except as provided for under Clause 8 and Clause 9, until all invited applicants or their substitutes, as provided for under Clause 7, shall have returned signed "Bidders' Agreement."

Clause 7.—Defaulting Applicants. Failure to Submit "Bidders' Agreement."—Should one or more bidders fail to return the "Bidders' Agreement" (Exhibit E) within 15 days of registered mailing date of the notification (Exhibit D), then the buyer may, if he so desires, choose other bidders to substitute for them under the same method described under Clauses 4 and 5, as the case may be, by or under the form by which the defaulting bidders were selected, and an extension of the time set for opening bids may be made.

Clause 8—Defaulting Bidders and Failure to Submit Bids.—Failure on the part of one or more bidders (after they have

Bidders' Agreement

Schenectady, New York, Date.....

Mr. E. H. Danforth, Chairman Building Committee,
Board of Education, Schenectady, N. Y.

Dear Sir:

.....hereby acknowledge receipt of your notification that .....have been chosen as one of the bidders on the..... .....work in connection with..... .....and hereby also acknowledge receipt of all plans, specifications, drawings and instructions to bidders, which ..... agree to return in good condition with ..... bid. .....hereby agree to submit ..... bid complete and in accordance with plans, specifications and instructions accompanying same on or before.....

(Buyer shall state here the time that all bids shall be opened)

In acknowledging this commission, ... agree to abide and conform to all rules and regulations set forth in "The Nelson Form for Choosing Bidders and Awarding Contracts," with which .....familiar.

Payment by you to ..... of the amount stipulated in the above mentioned "Nelson Form," based upon the average of all bids within the stipulated time after letting contract, will be considered by ..... a full and complete waiver of all charges and obligations.

Should ..... be awarded the contract, ... agree to abide by and conform to all rules, regulations and instructions contained in the plans and specifications.

Signed.....

Agreement made in Duplicate. .....

Exhibit E.

submitted signed "Bidders' Agreement") to submit their bids in due time or in correct form, shall not in any way obligate the buyer to defer or delay the awarding of the contract.

Clause 9—Failure to Secure Stipulated Number of Applications.—Should the total number of applications from bidders after advertising the stipulated time as per Exhibit A not reach the number provided for in Clause 3 or Exhibit F, then the buyer shall reserve the right to open bids and let the contract with the number of bidders that have made application, without in any way violating any of the rules, terms, agreements or intentions of this form.

Clause 10—Awarding the Contract.—If the buyer or buyers be acting in the capacity of public servants, or in behalf of organizations, they shall in accordance with the intent and

Column 1	Column 2	Column 3	Column 4	Column 5
Average of All Bids, or Estimated Net Cost of Contract	Approximate Square Root of Figure in Column 1	†Number of Bidders to be Selected. (Figure in Column 2 Multiplied by 0.04)	*Amount to be Paid Each Bidder. (Figure in Column 2 Multiplied by 0.7)	Total Cost of Competition. (Figure in Column 3 Multiplied by Figure in Column 4)
$ 50,000.00	224	9	$156.80	$1,411.20
60,000.00	245	10	171.50	1,715.00
70,000.00	265	11	185.50	2,040.50
80,000.00	283	11	198.10	2,179.10
90,000.00	300	12	210.00	2,520.00
100,000.00	316	13	221.20	2,875.60

EXPLANATION.

†Not less than two. As many more bidders may be selected as the buyer wishes to compensate.

To determine the total number of bidders, estimate the amount of the contract in dollars sufficiently high (Clause 3, Public Work); compute the square root and multiply by 0.04.

To determine the amount to be paid each bidder, add all bids (including any and all alternate figures asked for and received), divide the sum by the number of bids to get the average, then take the square root and multiply by 0.7. In case of fractions, the next highest whole unit number shall be used. Carefully read Clause 11, Public Work.

*The multiplication factor 0.7 is not set or established. It is the intention of this form that this factor should be determined or established by the seller individually or collectively in the same manner in which he sets the price upon any merchandise or service.

Where it is necessary for the bidder to incur traveling or other incidental expenses it is the intent of this form that he shall receive remuneration for same in addition to regular compensation provided for in Exhibit F. The bidder shall, however, make arrangements with buyer for such special compensation and have same accepted before bidding.

Exhibit F.

meaning of this form award the contract on the basis only of serving the best interests of the public or their constituents, as the case may be. No personal prejudices shall be shown or personal preferences given, but the award shall be based solely and only upon the basis of procuring the best material and service at the lowest cost. All bidders, however, to receive full compensation for estimating and furnishing competition, in accordance with Clause 11.

Clause 11—Paying for the Competition.—After all bids have been received and opened, the buyer shall within 10 days (whether or not contract has been awarded) pay to each and all bidders (who have bid in strict accordance and complied with all of the demands contained in the plans and specifications and all forms accompanying same and whose bids do not exceed by more than 25 per cent the amount of the bid upon which the contract is awarded, or the lowest legitimate bid, if contract is not awarded) in United States lawful money or equivalent a sum equal to the square root of the average of all bids received multiplied by 0.7, substantially as shown in table (Exhibit F), thus: If the average of all bids received shall be $90,000, the square root of which is $300, multiply $300 by 0.7, which equals $210, the amount which shall be paid to each competing bidder in payment for the labor and expense involved in estimating and as a complete waiver of all obligations. In considering the amount of each bid, the total bid, including the sums of all alternate estimates asked for by the buyer, whether they be additions or subtractions, shall be considered, and the amount to be paid the bidder shall be reckoned thereon as well as upon the total bid; as, for example, if the bidder is requested to estimate upon a brick building with alternate estimate upon stone and another alternate estimate upon frame construction, then assuming that the bidder's figure is $20,000 upon the brick building, $30,000 upon the stone, and $15,000 upon the frame building, then the sum total, or $65,000 shall be used in determining the sum to be paid the bidder. Should certain bidders refuse or neglect to figure or bid upon alternates, they shall be paid upon the basis of their actual bids only.

Certificate of Payment to Bidders

Date.....

To.....

.....

Bidder upon the ..... work

For.....

This is to certify that competition upon the above work has been held in accordance with the "Nelson Form for Choosing Bidders and Awarding Contracts" and that in strict accordance with all the terms of said form and agreement made with you as a bidder, there is hereby due you the sum of..... which will be paid upon presentation of this certificate.

Subscribed and sworn to before me by the said .....

this.....day of.....19..

Notary Public. Owner.

Exhibit G.

A certificate of payment (Exhibit G) shall upon request be given to each bidder, properly filled in, signed and sworn to by the buyer before a qualified notary public, setting forth that the competition has been conducted in accordance with this form, and that the amount credited or paid to the bidder has been reckoned and computed in strict accordance with this, the "Nelson Form for Choosing Bidders and Awarding Contracts," its true intent and meaning.

Private Work.

Clause 1—Selecting Bidders for Private Work.—If the buyer of the work to be figured upon is acting as a private individual, then he may choose his own method for selecting bidders, and he may select as many or as few as he may choose, or wishes to compensate.

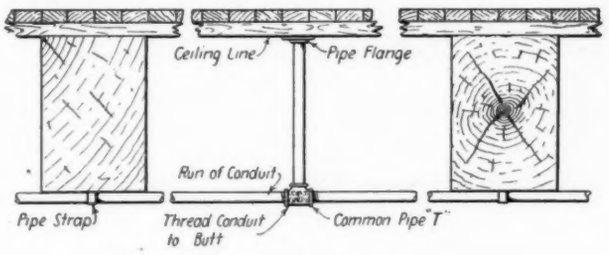
Clause 2—Awarding the Contract.—If the buyer be a private owner, he, his architect, his engineer or other form of representative shall reserve the right to make contract with any bidder he may choose, provided, however, that he shall fully compensate all invited bidders in accordance with Clause 3.

Clause 3—Paying for the Competition.—Paying for the competition in connection with work of a private character shall be done exactly as provided for in connection with public work and as shown and set forth under Clause 11, Public Work.

Supporting Conduit Between Beams in Mill Construction.

By C. W. Higinbotham.

The accompanying sketch shows a method that I sometimes have used for supporting conduit between the beams in buildings of mill construction when the hangers made for that purpose were not available. This method takes a little more time, but makes a very rigid and neat job. By threading the conduit into a T a coupling is dispensed with and a more stiff arrangement obtained. However, it is not essential to have the conduit joint come exactly at the pipe support; if it does not come so, the T must be large enough to allow the conduit to be slipped through easily.



Support for Conduit Between Beams.

Among the Contractors.

The Century Electric Company, Fifth and Mulberry Streets, Des Moines, Iowa, has secured larger quarters by the addition of space adjoining its present store. Manager George C. McAfee states that the present floor space will be doubled, giving facilities for taking care of the firm's rapidly growing business.

The Kansas City (Mo.) Electrical Company has been awarded the contract for wiring the new addition to the City Hospital at $3,000; also the contract for the Heinz Elevator Building, Council Bluffs, Iowa, at $6,000. In speaking of the trade, O. G. Pack, manager, said: "I am glad to say that our business has been exceptionally successful. We have had more work than we could easily manage."

Henry Newgard & Company, Chicago, Ill., have recently secured contracts calling for electrical installations in a number of interesting plants. Of particular interest is the wiring of the new Chicago warehouse for the Simmons Company of Kenosha, which will include a power installation of 200 amperes and a lighting installation of 400 amperes. The company is also installing a 1,200-kilowatt, 220-volt, direct-current generator for Wilson & Company, Union Stock Yards, Chicago, a feature of which is the running of 10 1,000,000-circular-mil cables for each leg.

Eric Allen and Lucian Grossmaire have purchased the electric wiring and supply business of E. J. Shaut, at Canisteo, N. Y.

Pratt & Thompson, of Kansas City, Mo., received the contract for the erection of a two-story service station for the Gustin-Bacon Manufacturing Company at Twenty-Seventh, McGee and the Trafficway, Kansas City, Mo.

DEALER AND STOREKEEPER

An Exchange of Ideas and Experiences on Advertising and Selling Methods, and Storekeeping for the Dealer in Electrical Appliances

THE VALUE OF A MOVING ELEMENT IN A WINDOW DISPLAY.

Dealers Can Make Use of Stock Equipment to Provide Motion in Displays.

The more the psychology of window displays is studied, the more clearly is it understood that the display which is in motion is the best display. This is true at least insofar as getting the attention of passersby is concerned, regardless of the after effect; and inasmuch as getting this attention is necessary before the display has any sales value whatever, it is quite evident that to secure it is to have accomplished something worth while.

The electrical dealer is by all odds best fitted for the creation of moving displays, because his stock in trade consists to a considerable extent of devices by means of which motion can be produced. Every dealer ought to connect up his windows so that he can use motors for the operation of appliances of various kinds, or to keep a table filled with merchandise turning slowly, so that it will catch and hold the restless eye of the passing pedestrian.

In connection with the appliance proposition, nothing convinces like a demonstration, and whether it is an electric washing machine or an electrically operated sewing machine, the fact that it is actually running is to the average person the best possible proof that it will do the things which are claimed for it.

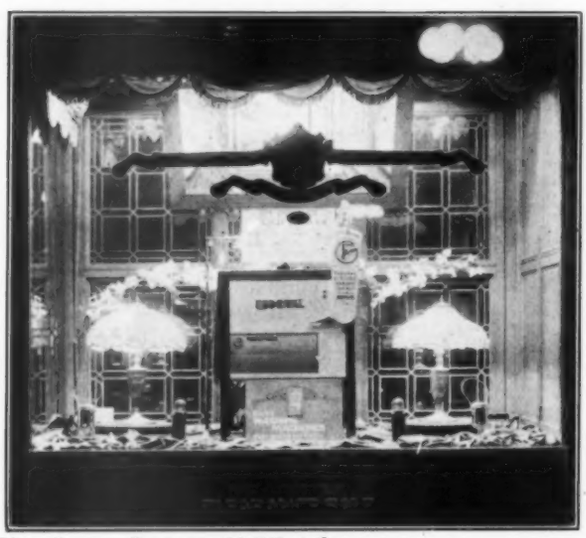


Photo Courtesy Commonwealth Edison Co.

An Illustration of an Attention-Attracting Display.

The window display shown is one exhibited in the Commonwealth Edison Company's Electric Shop on Michigan Avenue, Chicago, and illustrates to a marked degree the value of motion in a window display. The electric washing machine is kept in operation evenings as well as during business hours and a goodly percentage of the crowds that flock to that avenue is attracted to the window. Above the window a large mirror is suspended and tilted at an angle so that those in front of the window may easily see the moving apparatus in the tub of the machine.

Moving displays are not only, therefore, mere eye-catchers, which insure getting a crowd, important as that is; but they are also sales makers, because by means of them actual demonstrations may be carried out and conviction substituted for indifference in the mind of the prospect.

An Inexpensive Rack for the Display of Tubular Flashlamps.

A very neat and durable display stand for tubular flashlamps may be made at small expense from a few feet of one-half by four-inch oak lumber. Any other finished lumber will do, but oak is more desirable. The rack herein described was designed for holding nine flash lamps, and is 2 inches high, 35 inches wide and 2 feet 3 inches long.

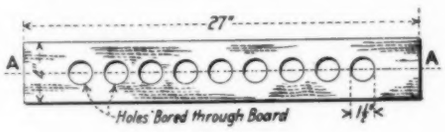


Fig. 1.

Nine holes, 1.5 inches in diameter and properly spaced, are bored through the center of the 4 by 27-inch board, as shown in Fig. 1, after which the board is ripped lengthwise through the center along the dotted line, *A-A*. The two pieces of the board thus sawed in half form the front and back of the rack. The rack is completed by nailing small end pieces in place between the sides, as illustrated in Fig. 2.

The rack should be stained or painted some desirable color, to give it a neat appearance. The channels or grooves in the front and back of the rack may be lined with felt, to prevent abrading the finish of the lamps that are to be displayed.

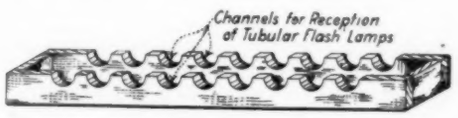


Fig. 2.

Entire Local Trade Being Secured by Louisville Lighting-Fixture Dealers.

Dealers in lighting fixtures in Louisville, Ky., have been getting recognition from local builders. For the last year and more they have had the satisfaction of seeing all the business developed in their territory awarded to them, with the exception of two contracts which were placed in the East. Fixtures shipped to one of these were rejected, but later accepted when concessions were made, while the other instance was that of a resident who chanced to have a favorable buying connection with an Eastern manufacturer. Only a few years ago there was a more or less general idea among the better class builders that it was necessary to go to the larger trade centers for their fixtures, but this idea is rapidly disappearing, with the result that dealers can afford to carry larger stocks because of the greater volume of business done.

Business Hints for the Electrical Dealer

Courtesy a Valuable Business Commodity—Selling Electric Fans to Retailers in Winter—Dealers Can Define Their Own Markets—Use of Novelty Electric Signs Increasing—Problems of the Community Store

By G. D. CRAIN, Jr.

THE commercial manager of a large public utility company, in making a talk to the appliance salesmen of the concern, was seeking to impress them with the necessity of being courteous to customers, whether they actually bought anything or not.

"People who come in here," he explained, "are on our lines and are our patrons; so that they deserve fair treatment, regardless of the amount of goods they purchase from you."

Without qualification, a statement of this kind would have suggested the inference that if those who visited the store had not been consumers of electricity, they would not have been entitled to courteous treatment. As a matter of fact, the commercial manager did not intend to suggest this inference, and therefore should have put the question of courtesy on the broad ground that everybody who has anything to sell must first of all sell good will, which is based entirely on courteous treatment.

The dealer who is operating a store entirely independently of any central-station connection should be courteous, and insist that his employees treat his customers in that spirit. He can't afford to do otherwise. He can less afford discourtesy than the pubic service company, for the latter in most instances has a monopoly, and consumers must deal with it whether they like it or not. The dealer is surrounded by competition, and his greatest asset is the good will of his customers.

"Courtesy first," the slogan of a great Chicago department store, is worth making the motto of every dealer.

Winter Fan Sales.

The use of electric fans in winter, for the purpose of keeping show windows clear, is growing, and retail merchants in all lines therefore constitute an excellent market for fans. Some of them are already equipped, on account of their summer needs, but others have to be shown in connection with their utility for the important task of enabling the show windows to be operated without loss of value on account of frosting. Keeping a fan in action, so as to insure circulation of the air in the window, will prevent moisture from congealing on the glass.

In this connection the dealer should remember that trade papers in most lines are helping him sell fans by calling the attention of their readers to the value of fans for winter use in their windows. Thus practically every merchant knows something about the proposition, and a circular letter to a list of several hundred, calling attention to the situation, would doubtless stir up considerable interest.

This would be one good way, incidentally, of moving any left-over second-hand fans, as a merchant who bought for a temporary use of this kind would appreciate getting a fan at a reduced price, even though he expected to use it for the ordinary purpose next summer.

Getting the Good Business.

"I don't want all the business—just the good business," said one of the greatest merchants the world has ever known.

And he proceeded to get it by making his store attractive to the best, rather than the poorest trade.

Every merchant has an opportunity to define his own markets, to decide what manner of men and women he will appeal to. By his location, by the sort of stocks he carries, by his advertising, by the management of his store and the display of his goods in the windows, he is indicating what sort of trade he wants and is prepared to handle.

The next time you approach your store, look it over critically, as if you were a customer with money to spend for electric equipment. Is it the sort of store that you, as a customer, would like to buy in? Does it impress you as an agreeable place to trade? Do the windows show signs of attention, and is the display presented in the attractive, snappy way that people associate nowadays with up-to-date stores? Is it, in short, the best place that this customer—with money to spend, remember—could possibly go for the goods he has it in mind to buy?

If your answers to these questions are not altogether reassuring and satisfactory, there is evidently work for you to do in creating an individuality of the right kind for your establishment. And it can be done!

Novelty Sign Business.

Selling novelty electric signs is almost a business of its own, because new ideas are being worked up all the time. It probably is not practicable to attempt to carry all of the novelties in this line, but, considering the volume of the business, the dealer should be prepared to supply most calls, and to secure special goods when they are needed. He should realize that the use of electric signs implies an appreciation of electrical appliances generally, and therefore reacts favorably on his own store, no matter whether he is selling them or not.

Showing how the idea of an electrical display for selling purposes is spreading, the writer recently saw a taxicab accompanied by an electric sign. It stood out at right angles from the windshield, an illuminated transparency carrying the words, "This Car for Hire." The sign was visible from both directions, and made an excellent display.

Speaking of signs reminds one that many store-builders, knowing that electric signs are popular with practically all merchants, are now furnishing signs of this kind, which can be readily altered as to lettering, as part of the permanent equipment of their buildings. One row of stores on the North Side in Chicago carries its own signs, the only apparent objection being the lack of variety. When a sign is not needed on account of the store being vacant, the owner uses it to advertise the fact that the space is for rent.

Taking it altogether, the sign business will do to watch.

The Neighborhood Store.

The most difficult merchandising problem is not that of the big downtown dealer but is that of the small electrical dealer in the suburb, handling a purely local or neighborhood trade. In the former case, location alone is going to keep a steady stream of transient business coming in, if proper use is made of this asset through the medium of window displays. And such a merchant can afford to advertise in a big way, inasmuch as all of the circulation of a daily paper or other standard advertising mediums is valuable. Being in a central location, he can pull business from all parts of his community, and the ways and means to business are pretty definitely laid out.

The suburban dealer, however, must be something of a business pioneer. He must chart his own course, and work out his own selling plans. If there is a neighborhood paper—and the number of good suburban weeklies seems to be on the increase—his problem will be simplified. The chances are, however, that his only available mediums will be the local moving picture show and advertising by mail. These two fit together very nicely, the picture show furnishing what might be called general publicity, and the letter specific business. The one can be used to acquaint the local public with the fact that the dealer is in the electrical business and where he is located, and the letter, describing some special appliance, and giving its advantages and price, can be relied on to pull business into the store.

It is necessary, in order to get results from a letter campaign, to have the right kind of mailing-list. Lists can be made up from many sources, including the telephone and general directories, but the best names are those of people who have dealt with you before. Get the name of everybody who comes into the store, because influencing another visit will be made all the easier on account of previous acquaintance.

The small dealer in the suburbs—and some of this type are not so small, either—has a field which will stand a lot of development. Some merchants of this type let the business go right by them to the downtown store, when aggressive and intelligent promotion work would keep it at home. All of the odds, other things being equal, are in their favor, the matter of convenient location and more prompt delivery alone being sufficiently important factors to decide many a sale.

Big Business in Office Buildings.

The office building as a market for electrical goods is worth consideration, all by itself. Few structures of this kind are supplied even with lamps, the tenant being supposed to furnish his own lighting equipment. Here alone is a big chance to get business, because lamps must constantly be replaced. In addition to this, the requirements for individual desk and typewriter lighting equipment are considerable, and when it is realized that the population of a big office building is constantly changing, new people coming in right along, it is evident that the chances to do business are greater than is usually understood.

In some instances salesmen of electrical concerns have been able to pay their way simply by soliciting lamp business among occupants of office buildings, picking up, incidentally, orders for other goods or repair jobs of one kind or another. It often happens that a business man downtown will remember, when he is approached by the representative of an electrical dealer, that his wife wants some work done at the house, and he is glad to give the order and get it off his mind.

The easiest way to develop this field, especially if the dealer has no outside salesman, is to cultivate the building managers and arrange to secure from them information regarding changes and removals. It is a convenience for the tenant to get in touch promptly with those who can supply lamps and other lighting equipment, and most building managers would be glad to inform the electrical concern of new arrivals, solicitation of whom would certainly result in business.

A Hint to the Sign Man.

No matter whether the sign concern has a contract for maintenance or not, it should realize that poorly kept electric signs are a bad advertisement for the sign business.

Yet the percentage of signs which are more or less out of commission as a result of burnt-out lamps being allowed to remain in their sockets is always considerable.

The very fact that an electric sign is conspicuous means that unless it is kept in good order it is going to detract from the standing of the advertiser, much as a soiled or torn business card would affect the standing of a salesman calling on a customer for the first time.

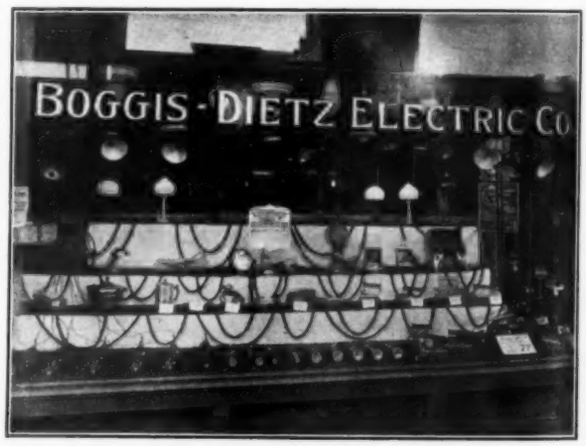
The Biblical injunction to keep your lamps trimmed and burning applies with special force to the modern electric sign, and maintenance should be watched with care.

The Electric Talking Machine.

The Victor Talking Machine Company is now featuring its electric talking machine, by means of which the owner is relieved of the labor of winding up the spring which has been used heretofore on all of the Victrolas to operate the mechanism. The introduction of the electric machine ought soon to make the motorless Victrola as obsolete as the automobile which has to be cranked. And just as many old automobiles are being equipped with self-starters, so there should be considerable business, for those who will go after it, in selling and installing small motors in hand-operated talking machines. Besides, the pleasure to be had from a Victrola can undoubtedly be greatly increased through the use of a motor, for without considering the labor of winding the spring the inconvenience of having to stop after every record has been played, in order that the spring may be rewound, is distasteful to a great many people. The electric talking machine ought to be an important contributor to the business of the field, both from the appliance and current-consuming standpoint.

Holiday Display Window Valuable Aid in Retailing Appliances.

During the pre-holiday season, when sales and competition are great, electrical dealers find window display space the most effective way of securing the attention of the gift-giving public. The dealer possessing a good knowledge of his goods finds no great difficulty in convincing the purchaser that electrical goods are appropriate, of utility, and



Milwaukee Dealer's Christmas Window.

comparatively inexpensive. The chief difficulty is in getting people inside the store to bring home the convincing arguments. It is in this way that the window display serves its most useful purpose.

The illustration shows the store front of the Boggis-Dietz Electric Company, of Milwaukee, Wis., as it appeared during the holiday season, though the photograph does not do justice to the display. The neat arrangement and the price and information cards on the different articles are, however, evident. One of the best sales-getters was the display of small electric irons, shown in the left-hand section of the window, and which resulted in so many direct sales that the firm was convinced that the efforts made in arranging the display were more than repaid.

NEW APPLIANCES

A Review of the Latest Developments and Information Respecting Electrical and Kindred Mechanical Appliances

New Chain-Pull Candle-Fixture Socket.

The tendency to combine two or more devices, thereby making a more compact unit, results in a material saving to the wireman and consequently in labor cost and initial outlay as well. This is especially true of a new chain-pull

New Chain-Pull Candle-Fixture Socket.

New Candle Socket Applied to Wall Bracket.

candle-fixture socket, recently placed on the market by Pass & Seymour, Incorporated, Solvay, N. Y. It is cataloged as P. & S. No. 1215.

It is no longer necessary to install a chain-pull switch in the bottom of the candle stem, or a switch in the fixture body or canopy, as this new device, being a combination of the socket and switch, presents at once the opportunity for individual control of the lamps on the chandelier, bracket or pendent candle-fixture, as may in any case be desired.

The elimination of awkward and difficult splices in small cramped spaces is a point in favor of this device from the standpoint of standard wiring practice. The wiring is easily accomplished because the terminals are of generous size and readily accessible. The screws are large and of sufficient length to accommodate the wires, and the raceways for the wires are deep enough to prevent crowding or bulging of the fiber casing.

This chain-pull candle-fixture socket is designed especially to work smoothly in the standard fiber or glass candle sleeve, yet is of sufficient diameter to fit snugly within the candle.

All live parts of the device are concealed within the body with the exception of the terminal plates, so that a short-circuit from careless wiring is entirely out of the question.

The nipple is seated deep in the body of the device and affords a solid connection for the pipe and socket. It is fitted with the standard set screw to prevent turning on the pipe. The chain may be easily removed, making it handy to refinish or to slip through the bobeche, when assembling the fixture.

The New Type of Apex Electric Vacuum Cleaner.

The success achieved by the Apex electric suction cleaner, particularly the type A3, which is noted for its long inclined dust-pan-shaped nozzle, has prompted the manufacturers of this device to bring out a larger or heavy-duty cleaner of this same type. This new model has been given a most critical trial for a year, and is now ready for the general market. Those who have given it this trial are very enthusiastic about the exceptional cleaning properties of this new appliance, and because of its special ability to get under things it has been given the trade name "Apex Submarine-type Cleaner." This new model follows the general lines of the Apex cleaner construction, to which there have been added three special and very important features, two of which are believed to be absolutely new and of an evolutionary character. These are:

First, the new cleaner is mounted on a three-wheel carriage, which leaves the body of the device free to operate its exceptional automatic adjustment, which latter permits the cleaner to pass readily from the bare floor to the thickest rug or carpet, at all times giving the maximum cleaning power through the automatic control of its suction space along its nozzle front, regardless of the extent of surface it may be cleaning.

Second, the upper wall of the nozzle is made of rounded, diagonally arranged protruding ribs, which distribute the suction evenly across the entire nozzle. These ribs ripple the surface of the floor coverings to enable the suction to draw up easily all deeply imbedded particles of heavy dirt, etc. The nozzle is also so arranged as to confine the air suction to the nap of the carpet and not on the surface. The nozzle has a width of 14 inches, and its special

New Apex "Submarine Type" Vacuum Cleaner With Detail Views of Nozzle.

interior construction gives the cleaner the exceptionally large cleaning surface of 42 square inches. None of this is a straight-up lift or pull, but a long forced suction from deep in the nap of the carpet.

A third new feature in this model is the introduction of

an improved form of revolving brush which is operated by traction and mounted in a sunken housing or shroud. The arrangement is such that the brush does not interfere with or impede the powerful suction, the latter acting over the extreme ends of the brush and gathering off the lint, hair, thread, etc., which is loosened and picked up.

The new model has a larger motor and fan to provide the more powerful suction that is required. The device has but two places that need to be oiled, each being provided with an automatic feed. The new model is said to be much lighter than machines of similar type. It operates with a natural side-arm swing motion, and is simple and safe. The whole outline of the machine, particularly the shining nozzle, is on pleasing symmetrical lines. The handle grasp is comfortably arranged. The rear carriage wheel is of the swiveling type, which enables the cleaner to turn quickly at right angles. This new submarine cleaner is merely an addition to the Apex line and does not interfere with the type of Apex cleaners now being marketed so successfully. It is manufactured by the Apex Electrical Manufacturing Company, Cleveland, O.

Westinghouse Cycle Counter or Timing Device.

As is generally known, it is not possible to obtain satisfactory results in the testing of time elements of high-accuracy relays and of circuit-breakers by using a stop watch, particularly where the selective action of the circuit-breakers is essential. For this purpose, the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has developed the cycle counter illustrated, which is a device for indicating definitely the number of cycles required for the relay to close its contacts.

The mechanism of this timing device consists essentially of an electric self-winding clock, the escapement of which is operated by an alternating-current oscillating magnet instead of a pendulum or balance wheel. At each cycle one tooth of the escapement is released. The self-winding clock periodically rewinds by means of power supplied from a shunt connection to the circuit when the cycle pointer has made 60 revolutions, the equivalent of 3,600 cycles. This arrangement keeps an even tension on the escapement. Thus the escapement magnet is not depended on to drive the indicator, but simply to regulate its speed. The power for driving is furnished by the clock mechanism.

In operation the cycle counter is connected in series with

Westinghouse Cycle Counter.

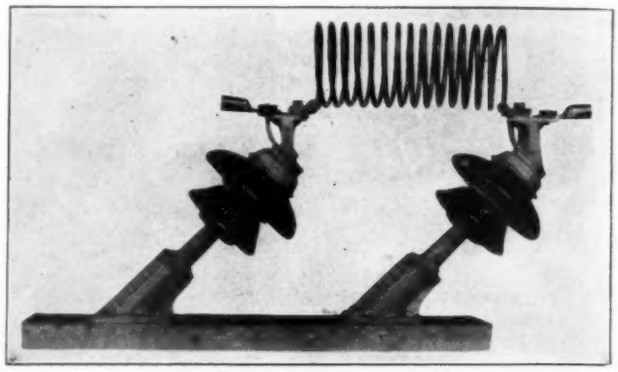
the relay on a circuit adjusted to give the current value at which it is required to test the relay. When the circuit is closed, the "cycle" pointer begins to revolve, one step per cycle, and continues to do so until the contacts are closed. The instrument acts as though it had no inertia; that is, it starts the instant power is applied and stops the instant power ceases.

Although primarily designed for use in testing or adjusting time-element relays, this instrument is suitable for a great variety of testing. Its particular field of usefulness is for measuring elapsed-time intervals of time too short to be satisfactorily observed with a stop watch where readings in steps of one alternation are sufficiently accurate, obviating the use of complicated and expensive apparatus, such as chronographs or oscillographs.

Given a known frequency, the readings can be reduced to seconds if desired. Conversely, by connecting the instrument to a circuit for a definite period of time the frequency can be determined. By adding contacts to machine tools, elevator machinery, etc., the time required for various functions can be determined. It will also be found useful in many laboratories and test rooms for timing purposes.

Outdoor High-tension Choke Coils.

Abrupt changes in the distribution or magnitude of electric charges other than the comparitively gradual changes due to normal operating conditions are known as "static disturbances." These disturbances travel along the sys-



New Unit-Type Choke Coil.

tem in the form of waves, causing a strain in the insulation of any apparatus reached. The chief sources of static waves are lightning, switching of circuits, and grounds or short-circuits of an abrupt nature. Exposed circuits are chiefly affected by lightning and switching disturbances of importance are usually developed in the stations.

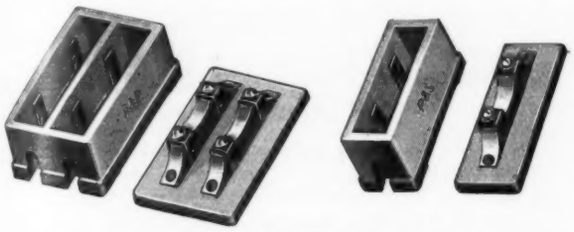
The strains caused by static disturbances of sufficient severity result either in a spark to the ground or a spark between layers or turns of coils. While the initial spark is small, this momentary breakdown of the insulation will cause an arc to be started by the normal operating voltage and it is this arc which causes serious damage. Choke coils by virtue of their inductance tend to flatten out abrupt static waves or disturbances which would otherwise cause strains on the apparatus. When installed between the apparatus and the lightning arrester, they tend to reflect surges back to the arrester, thus preventing damage to the apparatus.

The "unit type" choke coils manufactured by the Delta-Star Electric Company, Chicago, Ill., are designed for use in protecting outdoor substations, feeder lines, etc. Choke coils serve as a barrier to high-voltage disturbances and the necessity of high insulation is therefore apparent. In the design shown, rated at 13,200 volts, the insulators are rated at 27,000 volts with a flashover value of about 100,000 volts.

This high factor of safety insures that flashover will occur before puncture between the pin and the insulator cap. Each insulator is of the unit-type interchangeable design so that in case of accidental breakage a new insulator complete with cap and pin can be installed in a few moments. This type of equipment is also made for all voltages up to 66,000 and for various ampere capacities.

New Pass & Seymour Fittings for Foreign Trade.

A few months ago mention was made in these columns of some typical fittings of an extensive line which has been placed on the market by the Export Department of Pass & Seymour, Incorporated, Solvay, N. Y. This line has been



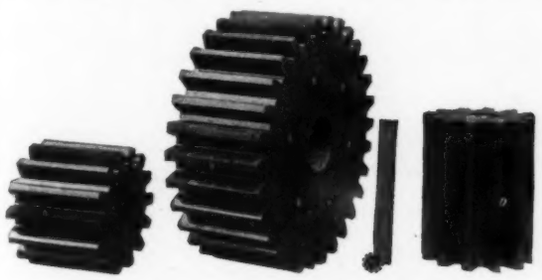
Double-Pole and Single-Pole Fuse Blocks for Export Trade.

further extended recently with a number of fittings, two of which are illustrated herewith. These two fittings, namely, a single and double-pole fuse block or fuse carrier, are not intended for use in this country, because they do not conform strictly to the standards of the National Electrical Code. They have been developed, however, for shipment to South America and Europe, where devices of this character are very largely used. The development of these fittings is another evidence of the progressiveness of this company in producing for the European and South American markets those electrical devices which they really want.

Large Noiseless Pinions.

An interesting example of what may be accomplished with Bakelite Micarta-D gear material, which was recently described in these columns, is shown by the gears in the accompanying illustration. As will be seen by comparison with the foot rule at the right of it, the pinion in the center is 21 inches in diameter and has an eight-inch face. It is designed to transmit 100 horsepower at 425 revolutions per minute. One of the particular features of this pinion, in addition to its large size, is the fact that no metal shroud was employed or needed. While this pinion may not be the largest one of the noiseless type ever produced, it is certainly big enough to prove of interest.

Bakelite Micarta-D gear material is a product of heavy duck bonded together with Bakelite by heating while under an enormous pressure, and is as strong as cast iron. It is



Some Samples of Bakelite Micarta-D Pinions.

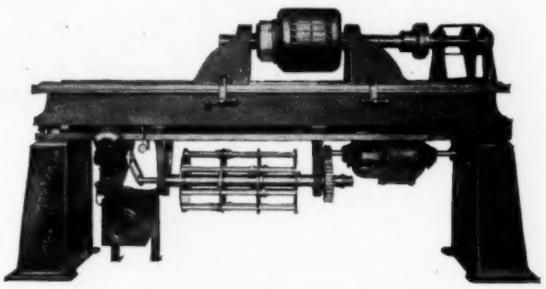
unaffected by atmospheric changes, cannot be destroyed by rats, is verminproof, and can be stored indefinitely without shrinking or other deterioration. It can be used for gears to operate in oil, without any signs of swelling.

The Akimoff Dynamic Balancing Machine.

A perfect dynamic (running) balance is something very hard to obtain. On the other hand, it is often to be desired, particularly in high-speed machines, where the importance of running balance is well understood. Rotating machinery cannot run properly unless it is perfectly balanced. Even a small amount of unbalancing will give rise to a host of troubles, such as noise, vibration, excessive power consumption, and undue wear of the bearings. These effects are especially serious in high-speed machinery, such as automobile crankshafts, motor armatures, and turbine runners.

As a means for determining the amount of unbalance obtaining and correcting it, N. W. Akimoff, chief engineer of the Dynamic Balancing Machine Company, Philadelphia, Pa., has perfected the machine shown. The machine is driven by a Westinghouse motor and the picture shows it ready for balancing a motor armature. The balancing of rotating elements of electrical machinery and of automobile camshafts have, so far, been two of the most successful applications for which this machine has been used. The principle upon which the machine operates is as follows:

An unbalanced condition of a body rotating at a relatively high speed may be due to lack of static balance or lack of dynamic balance. An indication of static unbalance may be obtained with a static balancing machine. Correcting for such unbalance involves drilling one hole or adding one weight to bring the center of the mass of the body on the axis of rotation. In a statically balanced body, however,



Akimoff Dynamic Balancing Machine.

two masses on opposite sides of the axis of rotation, located axially at a distance from each other, form on rotation a couple which develop vibrations, as is noted in defective commutators in electrical machinery, etc. The Akimoff dynamic balancing machine furnishes a means for determining easily and correctly the magnitude and plane of the couple, by the establishment of another couple, which, while maintaining the static balance, counteracts the couple which produces dynamic unbalance. The magnitude and plane of this couple indicates the correction to be applied to the body under test to produce a perfect dynamic balance.

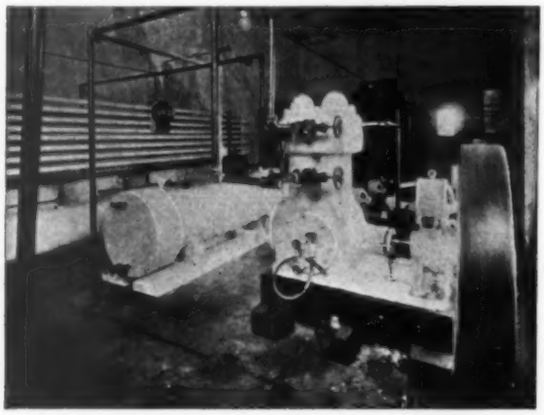
A rigid horizontal beam, such as a lathe bed, is hinged at one end of the machine and supported by a spring at the other. The body to be tested, already in perfect static balance, is rotatively supported on the beam. If dynamically unbalanced, the body will, on rotation, cause the beam to vibrate in a vertical plane. The object of the spring is to amplify the vibrations. A so-called squirrel cage is located on the underside of the beam and in operation is rotated in unison with the body being tested. This squirrel cage consists of two circular disks carrying an even number of rods arranged slidably in the two disks and parallel to the axis of rotation of the cages. When the ends of the rods are in one plane, the cage is in both static and dynamic balance, but if two opposite rods are displaced the dynamic balance is destroyed and the couple produced will itself cause vibration of the beam. One pair of rods in the squirrel cage would suffice if the relative position of the rods could be altered through the transmission device, but for convenience three or four pairs of rods are actually employed.

In making the test of a body the cage is adjusted so

that the vibrations produced in the beam by the body are damped out by those set up by the squirrel cage. An arrangement whereby the rods of the cage may be adjusted axially while the cage is in rotation is provided and by utilizing this arrangement the rods are shifted until the desired effect is produced.

Motor-Driven Movable Ice Plant for Road Show.

It is one thing to stage an ice ballet in the New York Hippodrome, where the show runs for an entire season, and quite another thing to transport a skating rink around the country with only a short run in each place. When it was

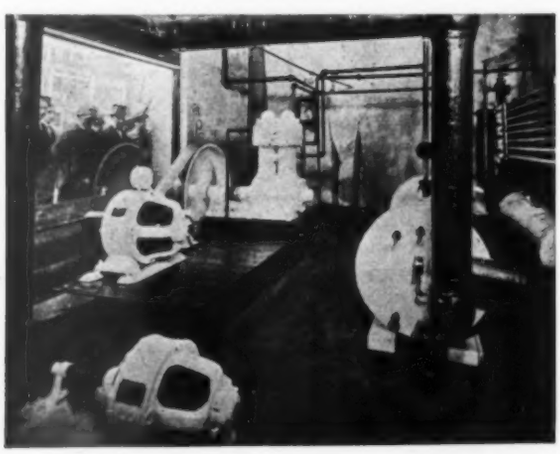


View of Movable Ice Plant Set Up for Service.

decided to send the Hippodrome company on the road, keeping intact the entire spectacle of "Around the World," including "Flirting at St. Moritz," said to be the most brilliant ice ballet ever staged, the one serious drawback was the problem of furnishing a suitable ice pond.

The adoption of the ice plant shown in the illustration proved to be the solution. The various units of this plant are transportable, each being mounted on a skid or stand, so that when the show closes it is only necessary to take down the piping, haul the different pieces of apparatus on a truck, pack them into a car, and ship to the next showing place. To prevent the loss of time required to erect the plant and freeze the water, which takes 24 hours, duplicate outfits are used. While one is working in one city the other is being set up at the next point, so that everything is in readiness when the company arrives. The first plant then goes to the succeeding point.

Each plant consists of a 10-ton York compressor, with two cylinders, each 6.5 by 6.5 inches, driven by a 20-horsepower, direct-current Westinghouse motor, and a 60-kilowatt Westinghouse motor-generator set. Where direct-current is available, the motors are operated directly from the power circuit, but as usually only alternating current is to be had, the motor-generator set is used to transform this into direct current for the operation of the motors.



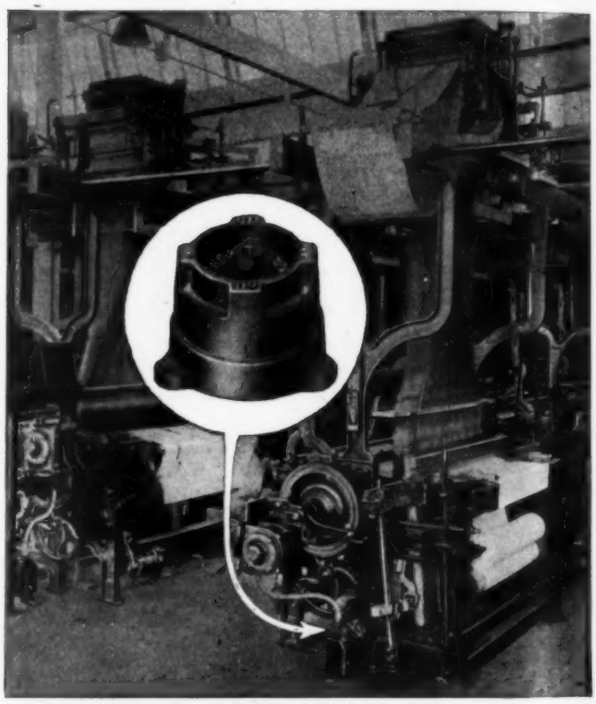
Another View of Motor-Driven Ice Plant.

The brine tank has a capacity of 1,900 gallons. The ice pond formed on the stage is 45 feet long, 20 feet wide, and 4 inches deep. While being frozen, the water is held in place on the stage by a canvas tub.

An Indicating Switch for Small Alternating-Current Motors.

In textile and other mills where machines are individually driven by alternating-current motors of two horsepower and smaller, the most satisfactory control is by means of an indicating snap switch. Because of the operating conditions and the character of labor employed in such service, it is necessary that such a switch be substantial enough to withstand severe use, else electrical connections might be disturbed with disastrous results.

With these conditions in mind, the Perkins triple-pole indicating switch shown herewith was designed. The "shell" or cover is a one-piece iron casting and is perfectly dust-tight, hence particularly adapted for mill installations. The switch mechanism, of course, is mounted on the usual porcelain block, which is entirely inclosed within the cover. As will be noted,



Perkins Triple-Pole Indicating Switch Used on Loom Motors.

the indicating switch handle is countersunk below the top rim of the cover, upon which are cast the words "off" and "on." Thus while the handle is perfectly accessible and the indication of the switch is readily observable, it is protected from damage and accidental operation of the switch is made impossible.

Three supporting ears are provided at the bottom of the cover and are so spaced as to permit of ready installation on types PG and ZG condulets.

This switch carries an approved rating of 20 amperes, 250 volts, and is for use in controlling three-phase alternating-current motors up to and including two horsepower. It is manufactured by the Perkins Electric Switch Manufacturing Company, Bridgeport, Conn.

ACTIVITIES IN THE TRADE

Cooper Hewitt Electric Company, Hoboken, N. J., has issued bulletin No. 67, descriptive of indoor-type, mercury-vapor electric lamps.

General Electric Company has had plans prepared for an addition to its Edison Lamp Works on South Fifth Street, Harrison, N. J., to cost about $250,000.

Western Electric Company, 195 Broadway, New York City, has prepared an attractive folder showing by illustrations practical and ornamental effects of Davis flood-lighting units.

Leeds & Northrup Company, Philadelphia, Pa., has issued Bulletin No. 434 on a student's Kelvin bridge, a simplified instrument for making low-resistance measurements and for teaching the principles of measurements to students.

Toledo Electric Sales Company, 508-510 Monroe Street, Toledo, O., has increased its capital stock from $25,000 to $50,000. The building boom in Toledo has forced the firm to carry a larger stock, said E. F. Baertshci, secretary of the company.

The Esterline Company, Indianapolis, Ind., has issued catalog No. 369, on Model EB Esterline graphic efficiency instruments. The catalog includes descriptions and illustrations of the construction of the different elements of its line of recording instruments.

The Robbins & Myers Company, of Springfield, O., announce the removal on January 1 of its Rochester (N. Y.) office to 740 Ellicott Square Building, Buffalo, N. Y. L. Larsen, the manager of the Rochester office, will be in charge of the new Buffalo office.

Motion Picture of St. Paul Electrification.—Employees of the Toledo Railways & Light Company were guests of the company recently to see the "King of the Rails," a motion picture of the electrified system and electrical devices employed by the Chicago, Milwaukee & St. Paul Railroad on its Rocky Mountain Division, showing them in operation.

The Emerson Electric Manufacturing Company, St. Louis, Mo., has leased a seven-story building, 100 by 150 feet, adjacent to its factory, giving the company 120,000 square feet of additional manufacturing space. The acquisition of the building by lease will dispense with the necessity of constructing a new plant for which plans have been drawn.

Naugle Pole & Tie Company, 5 South Wabash Avenue, Chicago, has issued a large folder calling attention to its very large stocks of northern and western cedar poles. These stocks are carefully assorted as to size, top and length, and are ready for immediate shipment at the yards of the company, which possess unusually fine shipping facilities.

Spray Engineering Company, 93 Federal Street, Boston, Mass., has prepared a bulletin on "Spraco" equipment for washing and cooling air, this equipment being especially applicable for steam turbine generators and other electrical machinery. Description of the machinery, its performance and other engineering data and information is given in the bulletin.

Roth Brothers & Company, Adams and Loomis Streets, Chicago, has issued bulletin No. 182, dealing with direct-current motors and generators. This bulletin has been completely revised and rearranged, and contains a full description, with many illustrations, of the extensive line of Roth direct-current motors of all types and motor-generator sets. Applications of some of these motors to various machines are also shown.

Barber-James-Dwinnell Electric & Manufacturing Company, Kansas City, Mo., has recently been reorganized, and more money and new stock holders have been added. The company closed the year with an increase in business of 40 per cent over that of 1915. It has outgrown its quarters also and is contemplating moving or enlarging the present headquarters.

United States Soldier Takes the Sadness Out of Wash Day.—The accompanying illustration is significant to the electrical trade, in that it shows the wide field there is for the electrical appliance, in this particular case the "Thor" electric washing machine, manufactured by the Hurley Machine

Border Soldiers Use Electric Washing Machines.

Company of Chicago. Camp "wash day" is by no means less irksome to the soldier than the "blue Monday" of the housewife, and the Brownsville trooper has not been slow in taking the sadness out of it by electrical means.

Bonus for Cutler-Hammer Employees.—The shop employees of the Cutler-Hammer Manufacturing Company, Milwaukee, Wis., received a Christmas present in cash December 23, and before New Year's Day a notice was posted which advised everyone of a bonus of 10 per cent of the yearly wages or salary. This bonus will be received by all of the 2,400 employees of the company.

Westinghouse Electric & Manufacturing Company will approve plans and arrange an appropriation of $15,000,000, it is said, for the erection of its proposed new plant at Essington, near Chester, Pa. The plant will specialize in the manufacture of steam turbines and condensers, and with area of about eight acres, will include general shops, iron foundry, pattern shop, and electric power plant for operation.

Victor Electric Corporation has opened a Kansas City sales and service station at 414 East Tenth Street, Kansas City, Mo. The company has made many installations in the Middle West, and finds it necessary to maintain this station in close touch with the customers as a feature of its service and to avoid delays in responding to calls.

Ivanhoe-Regent Works of General Electric Company, Cleveland, O., has been compelled, on account of increase in material prices, to increase its prices on the Ivanhoe line of metal reflectors. This is being done by revising discounts applying to these devices, and a new discount sheet, effective January 10, has been sent out.

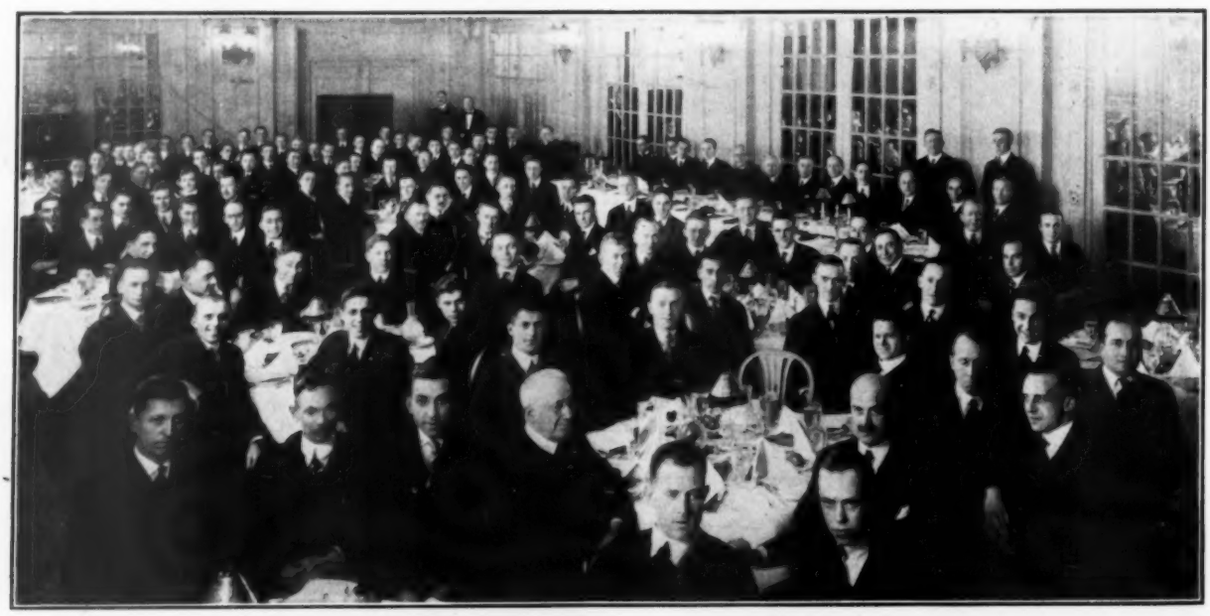
Jefferson Glass Company, Follansbee, W. Va., announces the addition to its sales force of Alfred L. Brunn, well known to the illuminating glassware dealers. Mr. Brunn is a man of wide experience in the glass and lamp business having been identified with the glass industry in various capacities for the past 25 years. During this time he has rendered valuable assistance to dealers, architects and builders in the selection of artistic and effective lighting combinations. His personality and knowledge of the trade guarantees him a favorable reception among Jefferson customers. Mr. Brunn is to have entire charge of the territory comprising Ohio, Indiana and Michigan, with headquarters at Follansbee.

Production of Tungsten Near Liverpool.—The manufacture of tungsten in the Liverpool, England, district has become important during the past two years. Wolfram ore is mined in limited quantities in Cornwall and Cumberland, but up to the outbreak of the war this ore had been exported to continental Europe, from which source large quantities of tungsten were imported. The first steps toward the manufacture of tungsten were undertaken by a Liverpool firm that established large works for its manufacture at Garston, Liverpool, and deliveries were begun during the first half of 1915. A second undertaking for the manufacture of tungsten came through the co-operation of 31 of the largest steel manufacturers in England, who erected a large factory at Widnes. It is stated that the supply of tungsten is now more than equal to the country's demands, while the price fixed by the government is considered low. Ferro tungsten is now sold at $1.34 per pound.

The Adams-Bagnall Electric Company, of Cleveland, O., has again placed its Chicago district territory in charge of Van N. Marker, with headquarters in Machinery Hall, 549 West Washington Boulevard, Chicago. Mr. Marker was associated with the Chicago office of the company for approximately seven years, up to March, 1916, and his return will be welcomed by his many friends in the electrical trade in that territory.

S. K. F. Ball Bearing Company, Hartford, Conn., has issued a well prepared 48-page booklet on self-aligning ball-bearing hangers and pillow blocks, in which is described the company's bearing and hanger, emphasis being placed on the power, lubrication and inspection savings as well as the reduced fire hazard with this type of hanger. The booklet also contains tables, curves and engineering data on mountings, lubrication, testing lubricants, felt seals, etc.

Exide Battery Depots Increase New York Facilities.—The increase in the use of "Exite" batteries for electric vehicles and for gas-car starting, lighting and ignition in New York City has made it again necessary for the Exide Battery Depots, Inc., to increase its service facilities. The general offices of the company have been moved and a new service station and garage opened at Sixty-fourth Street and West End Avenue, which will be the official "Exide" headquarters in New York City. The company will retain its West Side garage at 527 West Twenty-third Street, as well as its East Side garage at 141 East Twenty-fifth Street, giving the company three locations in New York. The new building is located in the heart of the automobile section, convenient to a great number of automobile and electric-vehicle dealers and users. The building is four stories high and was specially designed and constructed to meet the requirements of storage-battery work. The first floor will be used as a service station for the care and repair of automobile starting and lighting batteries and will also afford space for the garaging and care of a large number of electric delivery wagons and trucks. The general offices of the company will be located on the second floor. The battery room is conveniently located and there is an office and waiting room on the first floor for the convenience of customers. This new "Exide" service station and garage will be one of the most completely equipped in Manhattan.



"Harmony Dinner" Given by Central Electric Company's Sales Department.

To mark the culmination of a very successful sales conference held last week at the Central Electric Company's offices in Chicago, the sales department, under the sponsorship of Sales Manager Selzer, was host at a banquet at the Hotel Sherman, Friday, January 10, given to about 125 employees in other departments of the company's organization. The affair was a "harmony banquet," the "get-together" spirit prevailing to a high degree. C. E. Browne, secretary of the company, the principal speaker of the evening, gave a review of the year's activities and expressed the company's appreciation of the work of its employees. S. E. Kennedy, treasurer of the company, presided as toastmaster.

PERSONAL AND BIOGRAPHICAL

MR. JOHN SHORTT was appointed chief wiring inspector of the municipality of Saanich, B. C., at a recent meeting of the City Works' Committee.

MR. H. E. MUSSON, Jovian statesman for Oklahoma, formerly gas and electric expert for the State Corporation Commission, has become associated with Smith & Swan, of Henryetta, Okla., operators of a number of light and power plants in that district.

MR. JAMES L. KILPATRICK, of Philadelphia, Pa., for the past 20 years connected with the engineering department of the Bell Telephone Company of Pennsylvania and associated companies, has been appointed chief engineer for the company, succeeding MR. NATHAN HAYWARD, resigned.

MR. FRANK L. DRIVER, president of the Driver-Harris Wire Company, Harrison, N. J., manufacturer of electrical wires, has sailed for England to open a branch manufacturing plant for the company at Manchester, under the name of the Driver-Dennan-Cooper Company.

MR. HARRY T. HUGHES, auditor of the Denver (Colo.) Gas & Electric Light Company, has been elected treasurer of that company to succeed the late John T. Brady. He will be incumbent of both positions.

MR. LOUIS N. BRANT, manager for the New York Telephone Company at Orange, N. J., has been appointed manager for the company at Jersey City, N. J. He will be succeeded by MR. HORATIO BELL, formerly local manager at Englewood.

MR. L. H. HARSTOCK, manager of the Pacific Gas & Electric Company's property in Colusa, Cal., has been appointed to the position of manager of the company's offices in Grass Valley and Nevada City, Cal., made vacant by the recent death of MR. JOHN WERRY.

MR. MARTIN J. WOLF has been elected to the board of directors of W. N. Mathews & Brother, St. Louis, Mo., with the title of vice-president. Formerly he was sales manager of that company, and previous to that was manager of the Hotpoint Electric Heating Company, of Chicago.

MR. D. C. GREEN, manager of the Fort Smith (Ark.) Light & Traction Company, addressed the members of the Fort Smith Rotary Club at the regular meeting of the club on January 4, 1917. Mr. Green emphasized the need of co-operation in city building.

MR. RAY P. LEE, who has been president of the W. R. Garton Company, manufacturer and jobber of electrical specialties, Chicago, since 1907, effected a reorganization of that company January 1. The title of the new company is the Electrical Material Company, and it will take over the business of the W. R. Garton Company at 11 South Desplaines Street. MR. ELIJAH LEWIS, sales representative in the Iowa district, will be vice-president of the new company.

MR. A. L. MATHEWS has been elected vice-president of the J. G. White Management Corporation, to take charge of a new department, which has been organized for the management of sugar properties.

MR. W. R. WAGGONER, superintendent of the Salina (Kan.) Light, Power & Gas Company, operated by Henry L. Doherty & Company, has been transferred to the Montgomery (Ala.) Light & Water Power Company, where he will assume a similar position.

MR. SAMUEL G. HIBBEN, formerly head of the engineering department of the Macbeth-Evans Glass Company, of Pittsburgh, Pa., and associated with the Westinghouse Electric & Manufacturing Company, has recently become identified with the Westinghouse Lamp Company. Mr. Hibben is well known in the several

Samuel G. Hibben.

electrical and engineering organizations, and particularly for his activities in the Illuminating Engineering Society, being chairman of the Pittsburgh Section. He has also been engaged in consulting work in the lighting of a number of large buildings. With the lamp company he will continue in the engineering work, furnishing expert lighting advice to the various users of Westinghouse Mazda lamps. Mr. Hibben will have his headquarters at the Pittsburgh office.

MR. BYRON T. BURT, for the past two years vice-president and general manager of the Rutland (Vt.) Railway, Light & Power Company, has resigned to enter another field of activity not yet definitely announced. Mr. Burt has for many years been associated with companies operated by W. S. Barstow & Company, of New York, going to Rutland from Chattanooga, Tenn., where he was general manager of the Tennessee Power Company. A statement from Mr. Barstow expressed regret at Mr. Burt's resignation. The latter's successor is MR. F. S. NICHOLSON, heretofore vice-president and general manager of the Sayre (Pa.) Electric Company. He has had wide experience as a manager of public utilities.

MR. JAY B. FRANKE, Perth Amboy, N. J., has been appointed city electrician for a term of three years, effective January 1, 1917, by the Board of Aldermen.

MR. M. J. FOGARTY, formerly superintendent of the Orleans Electric Light & Power Company, Orleans, Pa., is now superintendent of the Erie Lighting Company, Erie, Pa.

MR. NATHAN HAYWARD, of Philadelphia, Pa., engineer for the Bell Telephone Company of Pennsylvania and associated companies, has been elected president of the American Dredging Company, to succeed the late William J. Bradley.

MR. ROBERT S. SCARBURGH, New York City, for the past six years advertising manager of the New York Telephone Company, has resigned, effective February 1, to become a partner in George C. Lee & Company, of New York, merchandise brokers. He will be succeeded by Mr. W. F. CROWELL, who has been connected with the company for 17 years.

MR. FREDERICK O. EATON, for some time cashier of the Rumford (Me.) Power Company, has been appointed general manager. MR. LEWIS SMITH is advanced to the position of superintendent of the Rumford Light & Water Company, and MR. CYRUS P. EATON, who has been vice-president of the latter corporation for almost 25 years, will retire on a pension owing to advanced years.

MR. GARDNER ROGERS, for the past seven years president of the Houghton County Electric Company and the Houghton Traction Company, in Michigan, has been appointed general manager of the Woonsocket branch of the Blackstone Valley Gas & Electric Company, Woonsocket, R. I., succeding MR. ALFRED F. TOWNSEND, who several months ago assumed the management of a group of Stone & Webster lighting, power and traction properties in Texas.

MR. DAY BAKER, formerly with the General Vehicle Company, New York, and prior to that the company's New England representative, has returned to Boston and taken offices at 110 State Street. He is now sales agent for the Hunt industrial electric truck, the Atlantic truck and a gas car. Mr. Baker's return to the scene of his successful achievements in Boston is welcomed by his many friends there and throughout New England. His earlier work for electrical vehicle interests has already been noted. In recognition of his activities he has been chosen chairman of the New England Electric Vehicle Section of the National Electric Light Association.

OBITUARY.

MR. HORACE D. BEAN, general manager of the Roller-Smith Company's factory in Bethlehem, Pa., died January 2 while on a visit to his old home at Penacook, N. H. He was 45 years old.

CURRENT ELECTRICAL NEWS

Weekly Record of Construction Activities

EASTERN STATES.

BATH, ME.—This city and district are now being supplied with electricity from the Central Maine Power Company's hydro-electric system, being connected with the Fort Halifax station 62 miles up the Kennebec River. The line is of 33,000 volts pressure. Formerly, energy was brought from the Androscoggin over a 11,000-volt line.

SKOWHEGAN, ME.—The Central Maine Power Company, of Waterville, has purchased the real estate and water power of the Skowhegan Pulp Company. The purchase also gives the power company the controlling ownership of the Skowhegan Ban Company, which includes the Keenebec water power rights in Skowhegan. It is reported that the purchase may lead to a new dam on the south channel of the river and other improvements, which, according to estimates, will cost $100,000.

ANTRIM, N. H.—The Public Service Commission has approved the sale of the electric properties owned by the Goodell Company in this city to the Antrim-Bennington Light & Power Company, a corporation recently organized. The latter company has also been given authority to do business in the towns of Antrim, Bennington, Hancock and Greenfield.

NEWPORT, N. H.—The Newport & Sunapee Electric Light Companies have nearly completed a transmission line between this town and Penacook.

MARLBORO, MASS.—The Marlboro Electric Company is installing an extension of its system in Northboro.

NEWBURYPORT, MASS.—The installation of a 13,000-volt line to connect the plant of the Newburyport Gas & Electric Company with that of the Amesbury Electric Light Company is being pushed. A cable 1,700 feet in length is being laid across the Merrimac River.

NEWBURYPORT, MASS.— The Newburyport Gas & Electric Company plans to extend its transmission lines into Newbury as far as Parker River, and later make extensions to Plum Island.

SHIRLEY, MASS.—The Shirley Electric Company has petitioned the Massachusetts Gas & Electric Light Commissioners for approval of an issue of 275 shares of common and 275 shares of preferred capital stock, the proceeds to pay the cost of plant extensions.

HARTFORD, CONN. — Vice-President Samuel Ferguson of the Hartford Electric Light Company has made a statement that the rapid expansion of the company's business necessitated an increase in the capacity of the Dutch Point power plant. Improvements have already been made, but they are to be supplemented by an extension of the boiler house in which two new boilers are to be installed which will serve a new 10,00-kilowatt turbogenerator.

CHATHAM, N. Y.—The Chatham Electric Lighting Company contemplates extending its distribution lines to the village of East Chatham where it will furnish service.

DUNKIRK, N. Y.—If the sum of $50,000 for stock subscriptions can be obtained a new power company will be organized to take over the plant of the Dunkirk Power & Heating Company. The project is being promoted by J. A. Bendure, of North Tonawanda, who proposes to operate the plant under the company's present franchise.

ITHACA, N. Y.—Plans are being made by the Cayuga Power Company for extending its transmission lines to the towns of Dryden, Freeville and Groton to furnish service in that district.

SAG HARBOR, N. Y.—The Long Island Lighting Company has filed a petition with the Public Service Commission asking authority to purchase the capital stock and bonds of the Sag Harbor Electric Light & Power Company, to merge that company, and to issue $25,000 capital stock and $4,000 bonds.

UNADILLA, N. Y.—The Standard Light, Heat & Power Company of this city, which recently purchased a number of electric-lighting plants in this section, is planning the erection of transmission lines to interconnect the plants.

ATLANTIC CITY, N. J.—The Atlantic City Electric Company has been granted permission by the Board of Public Utility Commissioners to issue bonds for $137,000, for proposed improvements and extensions.

ATLANTIC CITY, N. J.—In connection with the proposed erection of a local convention hall and coliseum, plans for which have been prepared by George Whitefield Chance, Philadelphia, an electric power and heating plant will be installed. The structure is estimated to cost about $2,500.

CAMDEN, N. J.—The Board of Freeholders has authorized the installation of power plant at the tuberculosis hospital; plans for the erection of a power house at the county asylum have also been approved.

JAMESBURG, N. J.—The Jamesburg Water Company is planning for the installation of a new water wheel at its plant in Lower Jamesburg, to provide increased power for its electric station.

NEWARK, N. J.—The committee on Public Buildings, Common Council, will receive bids up to 1 p. m. January 30, for improvements at the Newark City Hospital, Fairmont Avenue, including electrical wiring, elevator, heating and ventilating, refrigerating and ice-making plant, electric fixtures and vacuum. Plans at the office of Conklin & Convery, 665 Broad Street, architects. A. Archibald, city clerk.

NEW BRUNSWICK, N. J.—The County Building Committee will receive bids up to 3 p. m. January 25, for the erection of an electric lighting plant and pumping station at the new county workhouse, North Brunswick Township; also, for the erection of an auxiliary pump house. Plans at the office of Alexander Merchant, architect, 363 George Street, New Brunswick. Asher W. Bissett, Clerk.

PENNSGROVE, N. J.— The Borough Council has approved the installation of 400-candlepower street lights at street corners in the business district.

TITUSVILLE, N. J.—The Township Committee will install street-lighting systems at Titusville and Washington's Crossing.

TRENTON, N. J.—F. W. Ballard, Chief Engineer, Division of Light and Heat, Cleveland, Ohio, has been engaged by Mayor Donnelly to examine and report upon local water power properties with regard to possibilities for the installation of hydroelectric power plants for municipal service.

ALLENTOWN, PA.—The Lehigh Valley Transit Company is installing a new 10,000-horsepower steam turbine at its local power plant.

CHARLEROI, PA.—Plans are being made for the installation of a new street-lighting system. The West Pennsylvania Power & Lighting Company, which furnishes service, will make the installation.

CORRY, PA.—Local manufacturers are obtaining estimates on the installation of an electric light and power plant here.

DOYLESTOWN, PA.—The Public Service Commission is considering a complaint presented by local residents against the failure of the Pennsylvania & New Jersey Power & Light Company to operate its local plant, and for the improvement of service as now being rendered by the company.

NEW CASTLE, PA.—State charters have been granted to 16 electric service companies connected with the Mahoning & Shenango Railway & Light Company, of Youngstown, O. The companies are each capitalized at $10,000, will maintain offices here and will operate in townships and boroughs of Mercer, Lawrence and Butler Counties. The incorporators are L. B. Round, J. C. Chestnut, M. Pendleton, H. N. Wood and C. H. Apens.

NEWVILLE, PA.—The Borough Council is considering the establishment of a municipal electric power plant for local and neighboring community service.

TOWER CITY, PA.—The Gratz Electrical Company has been organized to establish an electric light and power plant with distributing system to furnish service in the western section of Schuylkill County.

POTTSVILLE, PA.—The power plant of the Eastern Pennsylvania Light, Heat & Power Company recently was destroyed by fire, causing a loss that may reach 500,000. About two-thirds of Schuylkill County is supplied with light and power from this plant and this district, including Pottsville, Tamaqua and a score of small towns, suffered a severe interruption to service.

NEWARK, DEL.—The Town Council is making provisions for improving the electric service here, plant extensions being involved.

BOONSBORO, MD.—The Antietam Electric Light and Power Company will build a new power house at Breathedsville, on Antietam Creek.

WASHINGTON, D. C.—It is reported that the Navy Department will improve the radio system in Alaska this year at a cost of $187,000.

NORTON, VA.—The Old Dominion Power Company, capitalized at $500,000, has been incorporated here. No announcement has yet been made of the company's immediate plans, but Secretary W. W. Kemp is authority for the statement that preliminary work on a power plant will soon be commenced.

LOGAN, W. VA.—Engineer F. R. Waller, Hibbs Building, Washington, D. C., is preparing plans for improvements to be made to the plant of the Logan County Light & Power Company. Bids will be opened January 26.

NORMAN PARK, GA.—An electric-lighting plant will be established to replace one that was destroyed by fire. The plant was owned by Norman Institute and operated by the city of Norman Park.

VALDOSTA, GA.—Plans are being made for extensive improvements to the cold storage and electric power plant of the Valdosta Lighting Company. The improvements will cost about $100,000. W. G. Eager is engineer.

NORTH CENTRAL STATES.

CHILLICOTHE, O.—Under the new contract entered into with the city by the Chillicothe Electric Company for a period of ten years, the city will pay $16,378 a year for street lights as against $17,986 under the old contract. Provision is also made for a number of additional lighting units.

CINCINNATI, O.—A. G. Rist is chairman of the boulevard lighting committee of the Main Street Merchants' Association, which is completing plans for the installation of an ornamental lighting system in Main Street from Fourth Street to McMicken Avenue.

DAYTON, O.— The Jamestown (O.) Electric Light Company is to be purchased by the Dayton Power & Light Company, and it is expected that negotiations will be completed by February 1, when the Dayton company will take over the plant and furnish service from its own lines, which will be extended there at once. Other construction will also be necessary in perfecting the service.

SPRINGFIELD, O.— The Springfield Light, Heat & Power Company will make additions and alterations to its plant which will cost in the neighborhood of $125,000. The improvements as now planned will consist of enlargement of the coal storage houses and also of the boiler rooms. A substation will also be erected.

WEST LEIPSIC, O.—The Village Council has granted a 25-year franchise to the Northwestern Ohio Light Company to furnish energy for street lighting and private consumption. Plans are being considered for a modern street-lighting system.

BLOOMINGTON, ILL.—The Bloomington & Normal Railway & Light Company has increased its capital stock from $1,650,000 to $1,900,000. Plant improvements are planned.

CHICAGO, ILL.—Trustees of the Sanitary District propose to submit a bill to the State Legislature authorizing the installation of a hydroelectric plant at Brandon's Road, five miles south of Joliet. The estimated cost of the plant is placed at $5,000,000 and the maximum capacity at 28,000 horsepower. Fred D. Breit is chairman of the Board of Trustees of the Sanitary District.

GALESBURG, ILL.—Ornamental lamps for Broad Street between the Santa Fe and Simmons Street, including a system along both sides of Central Park, are practically assured. The petition to the City Council asking for the installation of the lamps is ready, but its presentation to the Council has been delayed.

DETROIT, MICH.—The board of auditors of Wayne County is making plans for the installation of electric power plant in the county building. According to County Auditor Gutman, bids will be called for soon.

GRAND RAPIDS, MICH.—Property owners and others interested in the development of Michigan Street have asked the Board of Public Works to provide boulevard lamps around the new armory at Michigan Street and Ionia Avenue. A movement is also on foot to install lamps on Ionia Avenue from Monroe Avenue to Michigan Avenue.

GRAND RAPIDS, MICH.—The Commonwealth Power, Railway & Light Company is arranging a comprehensive program for construction during 1917. This will include completion of the 20,000-horsepower dam on the Manistee River, work on which started last fall; a fifth development on the Au Sable River and completion of two 10,000-kilowatt steam plants as additions to the power plants in Grand Rapids and Flint, both now under construction. The development of the proposed Grand Rapids terminal to Monroe Avenue frontage will involve the investment of $1,000,000 or more, but whether this will be undertaken this season has not been determined.

ISHPEMING, MICH.—The Marquette County Gas & Electric Company has asked permission of the city to erect a pole line through Ishpeming, in order to deliver energy to the plant of American Boston Mining Company at Diorite.

AMERY, WIS.—The Apple River Milling Company, which owns the electric-lighting plant at Little Falls, will extend its transmission lines and furnish service to Cumberland, Almena, Comstock, Clayton and Turtle River. E. J. Schneider is president of the company and manager of its local office.

IOLA, WIS.—The property of the Iola Electric Light & Power Company has been purchased by the Central Utilities & Security Company of Delaware through W. N. Albertson & Company, of Milwaukee. The Central company is planning to purchase a number of electric-lighting plants in this district and intends to make plant improvements as well as develop water-power sites it has obtained in Northern Wisconsin. E. G. Nehles, of Milwaukee, is manager of the company's property in Wisconsin.

LOMIRA, WIS.—The Wisconsin Gas & Electric Company is making extensions of its transmission lines in Fond du Lac County, from Lomira to Ashford, Campbellsport, Eden and Marblehead. Another line is being erected between Theresa and Lomira and lines will also radiate from Lomira to Brownsville and Knowles, the local plant being used as the central distribution point.

MARION, WIS.—The plant of the Marion Light & Power Company was damaged by fire recently, repairs to which are now being made. Paul Reiche is manager.

NEENAH, WIS.—Action will be taken by the Common Council soon to establish a new street-car terminal in this city. A new franchise is to be granted to the Wisconsin Traction, Light, Heat & Power Company for extending its lines so that a terminal station may be erected.

RACINE, WIS.—The Milwaukee Electric Railway & Light Company contemplates an addition to its local power plant, to cost about $20,000.

DATES AHEAD.

Indiana Electric Light Association. Meeting of New-Business Committee, Muncie, Ind., January 23. Chairman, O. M. Booher, Kokomo, Ind.

Western Association of Electrical Inspectors. Annual meeting, Hotel Secor, Toledo, O., January 23-25. Secretary, W. S. Boyd, 175 West Jackson Boulevard, Chicago, Ill.

Electrical Contractors' Association of Illinois. Mid-winter meeting, Hotel Sherman, Chicago, January 25-26. Secretary-Treasurer, Louis B. Van Nuys, Central Electric Company, Peoria, Ill.

American Institute of Electric Engineers. Mid-winter convention, New York City, February 7-9. Secretary F. L. Hutchinson, 33 West Thirty-ninth Street, New York City.

New Mexico Electrical Association. Annual convention, Albuquerque, N. M., February 12-14. Secretary pro tem., E. A. Thiele, Roswell, N. M.

Arkansas Association of Public Utility Operators. Annual convention, Pine Bluff, May 16-18. Secretary-treasurer, R. B. Fowles, Pine Bluff Company, Pine Bluff, Ark.

Electric Supply Jobbers' Association, Semi-annual meeting, Homestead Hotel, Hot Springs, Va., May 22-24. Secretary, Franklin Overbagh, 411 South Clinton Street, Chicago, Ill.

BROOK PARK, MINN.—The installation of an electric-lighting system is under consideration here. R. P. Allen is interested.

DEER RIVER, MINN.—A deal is pending between the Everton Electric Light & Power Company of this village and businessmen of Eveleth whereby the plant which now furnishes light and power to this village may become the property of the latter, or they will become members of a new company formed with W. A. Everton. It is planned to enlarge the plant, change it over from direct to alternating current and add to it a steam-heating plant for the business district.

SPOONER, MINN.—The Minnesota, Dakota & Western Railroad Company, of International Falls, contemplates the erection of an electric transmission line from Spooner to Goodridge.

TOWER, MINN.—The City Council is considering the installation of 125-horsepower engine in the municipal electric-lighting plant.

WACONIA, MINN.—A franchise has been granted to the Waconia Light & Power Company to furnish electric service in Victoria.

COUNCIL BLUFFS, IOWA.—Main Street business men have petitioned for improvements to street lights. J. C. Jenson is interested in the plans.

DEEP RIVER, IOWA.—Plans are being prepared for the installation of an electric-lighting plant here.

PACKWOOD, IOWA.—The Council is considering the granting of a franchise to the Iowa Gas & Electric Company to supply the city with electricity.

PERRY, IOWA.—The Iowa Railway & Light Company is making the installation of a new power plant in this city, buildings for which have practically been completed. The company is extending its service in this vicinity and the new plant will be used to supply the demand for energy.

LINCOLN, NEB.—The Lincoln Traction Company contemplates the construction of an extension from Lincoln to Omaha, 49 miles, during 1917.

WINSIDE, NEB.—A bond issue of $7,500 for an electric light plant was carried at the local election.

GWINNER, N. D.—The Gwinner Electric Light & Power Company has been incorporated with a capital of $5,000. J. B. Abrahamson is the manager of the company.

WATFORD CITY, N. D.—The installation of a new generating unit in the local electric-lighting plant will be made.

SOUTH CENTRAL STATES.

MURRAY, KY.—It is reported that the contract for the installation of the municipal electric-lighting plant, to cost about $20,000, will be let February 1.

NASHVILLE, TENN.—The Great Eastern Light & Power Company, with a capital stock of $5,000, has been incorporated to develop water power and other natural resources. The incorporators are W. A. Batten, B. B. Askew and others.

CHARLESTON, ARK.—A franchise has been granted to the People's Service Company, of Muskogee, to furnish electric service here.

NASHVILLE, ARK.—The Nashville Ice, Coal & Light Company is planning to extend its distribution system to the town of Mineral Springs to furnish service there.

VAN BUREN, ARK.—The Fort Smith Light & Traction Company will build a one-mile transmission line extension from Van Buren to the plant of the Arkansas Zinc & Smelting Company. D. C. Green is vice-president and general manager.

MOORELAND, OKLA.—The city has issued $10,000 in bonds for the installation of an electric-lighting system.

NEW WILSON, OKLA.—Bonds in the sum of $47,700 have been voted for an electric-lighting plant and waterworks system.

WOODVILLE, OKLA.—A charter has been granted to the Woodville Electric Light & Power Company. The capital is $1,500 and the directors R. L. Buck, J. W. Bacon and others.

CARRIZO SPRINGS, TEX.—W. A. Cunningham, of Bowie, has purchased the electric light plant here and is installing new machinery.

CUERO, TEX.—The Texas Electric Company, which operates electric light and power plants at Cuero, Victoria, Beeville, Corpus Christi, Yorktown and other towns of South Texas, has changed its name to the Texas Gas & Electric Company. R. H. Morris of Cuero is superintendent. It is stated that the company has adopted plans for greatly enlarging its scope of operations during the coming year.

DALLAS, TEXAS.—W. D. Johnson, engineer for the Criminal Courts Building, has made a recommendation to the County Commissioners for the installation of an additional unit in the electric plant at the Criminal Courts Building. The unit will cost about $12,000. The county furnishes service for the county buildings and for the Commerce Street and Oak Cliff viaducts.

DUBLIN, TEX.—The City Council has granted a 50-year franchise to the Texas Power & Light Company, of Dallas, for the construction and operation of a lighting system here. The Texas Power & Light Company has purchased the electric power plant of the Central Texas Power & Transmission Company at Hico, which also furnishes service here.

WESTERN STATES.

CIRCLE, MONT.—D. H. McKinzie and Walter Schroeder, of Wibaux, contemplate the installation of electric-lighting plant here.

SHELBY, MONT.—J. A. Johnson, manager of the local electric-lighting plant, has purchased equipment to secure additional plant capacity.

GALLUP, N. M.—George A. Keepers has applied to the city for a franchise granting him the privilege to construct an electric plant and lighting system in this city. He expects to invest $75,000 in the enterprise and will have the plant in operation by June 1 if the franchise is granted.

CLARKDALE, ARIZ.—The Arizona Power Company is constructing an electric generating plant with a capacity of 10,000 horsepower in this city.

DOUGLAS, ARIZ.—The bid of the Douglas Traction & Light Company of $14,750 for lighting G Avenue and Tenth Street has been accepted.

JEROME, ARIZ.—The Oak Creek Power Company has incorporated in this city with a capital stock of $750,000. O. S. Chick and Andres Nesteire of Cornville, Yavapai County, are the incorporators.

KINGMAN, ARIZ.—The recent storm in this section did considerable damage to the lines of the Desert Power and Water Company, the Goiconda power line suffering the most damage. Long-distance lines of the Arizona, California & Nevada Telephone Company were also damaged.

SALT LAKE CITY, UTAH.—A franchise for the construction of an interurban electric line from Murray into Big Cottonwood and Little Cottonwood canyons has been granted to Le Grand Young. It is expected that construction work will be commenced early in the spring. The line will be used to haul ore from the Cottonwood mines.

JULIAETTA, IDAHO.—F. C. Holbrook

announces that he is making extensive improvements in his local electric-lighting plant. A new gasoline engine and meter have been installed.

POCATELLO, IDAHO.—An ordinance authorizing the city to enter into a contract with Joseph Burns for the purchase by the latter of a water-power site on the Portneuf River, hydroelectric generating plant and transmission system has passed its first reading of the City Council. Under the terms of the contract the city is to purchase power for a period of ten years at the rate of one-half cent per kilowatt-hour. At the end of that time the property is to be conveyed to the city.

INDEX, WASH.—Engineer G. N. Miller, Burke Building, Seattle, will prepare plans for a municipal plant at this place. Water is to be taken from Deer Creek and carried two miles to a power plant in a gravity pipe line. Bonds are to be issued and bids called for within the next three months.

PALOUSE, WASH.—The City Council is considering the proposal of the Washington Water Power Company, of Spokane, to extend its transmission lines to this city and erect a distribution system. The Washington-Idaho Light & Power Company, of Lewiston, Idaho, it is understood, will submit a similar proposition.

SEATTLE, WASH.—The Seattle, Renton & Southern Railway, an electric line with offices here, will spend some $150,000 in making improvements and betterments during the present year.

SEATTLE, WASH.—Claiming that the city cannot issue bonds without submitting them to the voters, Bruce Shorts, of the law firm of Ballinger, Battle, Rubert & Shorts, as a taxpayer, has appealed to the Superior Court in two suits to prevent the issuance of $390,000 in bonds for the municipal steam plant for the generation of electricity and $60,000 for a water department, pumping station, etc.

TACOMA, WASH.—Bids have been called for by the Bureau of Yards and Docks, Navy Department, Washington, D. C., for the installation of telephone and power transmission lines between the Pacific Coast torpedo station, Keyport, Wash., and the Puget Sound navy yard; also an electric transmission line from the Olympic Power Company's pole line to the radio building.

OREGON CITY, ORE.—Plans are being made by city officials for purchasing the local electric-lighting plant.

STAYTON, ORE.—A mill, to be operated by electricity and built at a cost of $20,000, will be located near Elk Horn on the Little North Fork of the Santiam River. The new mill is owned by the Crown Mining & Milling Company.

BURBANK, CAL.—Bids have been called for by the Board of Trustees for the installation of an ornamental street-lighting system on San Fernando Boulevard.

CHICO, CAL.—The Western Gas & Electric Appliance Company has been awarded the contract for the installation of the new electrolier lighting system which will be installed here.

CROCKETT, CAL.—The Great Western Power Company will build a substation on a nine-acre tract recently purchased near Valona.

HANFORD, CAL.—The only bid received for the local electric franchise was from the Mt. Whitney Power & Electric Company, which was accepted.

HANFORD, CAL.—An election will be held the latter part of January to vote on the proposition of bonding the city to the extent of $45,000 for the installation of an electric fire-alarm system.

LOLETA, CAL.—Libby, McNeil & Libby will expend $60,000 remodeling its milk-condensing plant here. The concern will install its own power plant. A. L. Fritz is manager.

LOS ANGELES, CAL.—The City Council has consented to a transfer of the Home Telephone Company's franchise to the Southern California Company. The construction work required for the merger will cost in the neighborhood of $750,000. An extension will be built to Palms, San Pedro, Wilmington and adjacent territory at once.

LOS ANGELES, CAL.—The Pacific Electric Company has filed application for the right to condemn certain lands from La Habra to Fullerton for right-of-way purposes. It is the intention of the company to extend lines to connect with the Los Angeles-Riverside gap of the Whittier-La Habra line and to build an additional line from La Habra to Santa Ana. The new extensions will cost about $50,000 per mile.

OXNARD, CAL.—Light and power consumers of this locality are considering the installation of a municipal light and power plant.

PACOIMA, CAL.—The Tejunga Water Power Company, with offices in Los Angeles, will spend $50,000 for improvements in Big Tejunga canyon, including additional pipe lines.

PALO ALTO, CAL.—An election will scon be held to vote on the issuance of bonds in the sum of $75,000 for the purchase of two Diesel engine units as additions to the municipal power plant.

REDONDO, CAL.—It has been decided to install an ornamental electric-lighting system on Diamond Street. Gas was proposed, but a straw vote of the property owners decided in favor of electricity.

SACRAMENTO, CAL.—George G. Radcliff, state superintendent of capitol buildings and grounds, in his biennial report, recommends that in drawing plans for the two new buildings of the capitol extension architects be requested to prepare the basement plan to accommodate an electric-lighting plant, making it possible for the state to furnish all departments with light and power.

SAN DIEGO, CAL.—A franchise has been granted to the Los Angeles & San Diego Beach Railway Company to construct and maintain a street-railway system in the city of San Diego.

SAN FRANCISCO, CAL.—Bids have been called for by the Constructing Quartermaster, Fort Mason, for installing an electric-lighting system for the officers' quarters.

SAN FRANCISCO, CAL.—The California Railroad Commission has issued an order authorizing the Pacific Gas & Electric Company to issue $2,500,000 face value of its general and refunding five-per-cent bonds due January 1, 1942, at not less than 90 per cent of par. The proceeds are to be expended under the commission's orders for the construction, completion, extension and improvement of its system.

WHITTIER, CAL.—The contract for the installation of an ornamental lighting system in Philadelphia Street has been let to John E. Wilson, of Los Angeles.

WOODLAND, CAL.—Plans are being made here for a white-way system in Main Street from the Southern Pacific tracks to Cemetery Avenue.

Financial Notes

At their annual meeting, stockholders of the Wagner Electric Manufacturing Company voted to increase the capital stock from $2,000,000 to $5,000,000.

Detroit Edison Company has listed on the New York Stock Exchange $2,645,500 additional capital stock, making the total amount listed $19,650,000. The new stock was issued in exchange for an equal amount of convertible debentures issued October 21, 1914.

The Massachusetts Public Service Commission has approved the petition of the West End Street Railway Company to issue $2,700,000 bonds to fund a similar issue maturing February 1, 1917. Bonds are to run for 30 years and to bear interest at not to exceed six per cent.

Central Arkansas Railway & Light Corporation, a subsidiary of Federal Light & Traction Company, is asking for tenders until February 1 through the Columbia Trust Company of sufficient of its first-lien 15-year bonds to exhaust $39,162 now available for the sinking fund.

Operated subsidiaries of Massachusetts Lighting Company's reported net sales of gas and electric current for December as $129,800, an increase of $17,303 over December, 1915, the largest monthly gain yet made by these properties. For the six months ended December 31, total net sales were $708,592.

The board of governors of the New York Stock Exchange has approved the listing of the $18,000,000 of first and refunding 25-year, Series A five-per-cent bonds of Northern States Power Company, dated April 1, 1916, and maturing April 1, 1941. The proceeds of the sale of these bonds were used, together with other proceeds from the sale of notes and preferred stock, in retiring $22,664,500, of underlying securities at a cost in redemption premiums and interest of $23,905,915, and to provide $2,000,000 for extensions and additions to properties.

Stockholders of the Union Switch & Signal Company have approved the plan to merge that corporation with the Westinghouse Air Brake Company, according to an announcement. Directors of the companies took the first step to making the consolidation effective by electing repre-

WEEKLY COMPARISON OF CLOSING-BID PRICES OF ELECTRICAL SECURITIES.
Quotations furnished by F. M. Zeiler & Co., Rookery Bldg., Chicago.

	Div. Rate Per Cent	Bid Jan. 8	Bid Jan. 15
Public Utilities—			
Adirondack Electric Power of Glens Falls, common	....	28	27
Adirondack Electric Power of Glens Falls, preferred	6	90	89
American Gas & Electric of New York, common	10+extra	141	141
American Gas & Electric of New York, preferred	6	51	50½
American Light & Traction of New York, common	....	378	384
American Light & Traction of New York, preferred	6	112	113
American Power & Light of New York, common	4	80	80
American Power & Light of New York, preferred	6	89	89
American Public Utilities of Grand Rapids, common	....	39	39
American Public Utilities of Grand Rapids, preferred	6	71	71
American Telephone & Telegraph of New York	....	123½	123½
American Water Works & Elec. of New York, common	....	13	112
American Water Works & Elec. of New York, particip	7	27	27
American Water Works & Elec. of New York, first preferred	....	73	72
Appalachian Power of Bluefield, common	....	8	7½
Appalachian Power of Bluefield, preferred	7	40	41½
Cities Service of New York, common	6	318	309
Cities Service of New York, preferred	6	94	93½
Commonwealth Edison of Chicago	8	142½	136¾
Comm. Power, Railway & Light of Jackson, common	4	59	60
Comm. Power, Railway & Light of Jackson, preferred	6	80	84
Federal Light & Traction of New York, common	....	15	14
Federal Light & Traction of New York, preferred	....	55	55
Illinois Northern Utilities of Dixon	6	82½	82
Middle West Utilities of Chicago, common	....	60½	60½
Middle West Utilities of Chicago, preferred	6	81	80½
Northern States Power of Chicago, common	7	104½	104
Northern States Power of Chicago, preferred	7	98½	98½
Pacific Gas & Electric of San Francisco, common	5	62	62¾
Pacific Gas & Electric of. San Francisco, preferred	6	93¾	9a
Public Service of Northern Illinois, Chicago, common	7	113½	113
Public Service of Northern Illinois, Chicago, preferred	6	102	100
Republic Railway & Light of Youngstown, common	4	48	48
Republic Railway & Light of Youngstown, preferred	6	74	74
Standard Gas & Electric of Chicago, common	....	15	14½
Standard Gas & Electric of Chicago, preferred	6	42	41½
Tennessee Railway, Light & Power of Chattanooga, common	....	9½	9½
Tennessee Railway, Light & Pwr. of Chattanooga, preferred	6	43	43½
United Light & Railways of Grand Rapids, common	4	47½	48½
United Light & Railways of Grand Rapids, preferred	6	77½	77½
Western Power of San Francisco, common	....	20	19
Western Power of San Francisco, preferred	6	71	67
Western Union Telegraph of New York	5+extra	95¾	95⅞
Industrials—			
Electric Storage Battery of Philadelphia, common	4	66¾	66
Electric Storage Battery of Philadelphia, preferred	4	66¾	.....
General Electric of Schenectady	8	167	167½
National Carbon of Cleveland, common	....	331	329
National Carbon of Cleveland, preferred	7	133	133
Westinghouse Electric & Mfg. of Pittsburgh, common	5+extra	54	53½
Westinghouse Electric & Mfg. of Pittsburgh, preferred	7	.....	69

sentatives of the air brake company to the Union Switch & Signal Company directorate. W. D. Uptegraff, president of the switch company, was named chairman of the board of directors of the new corporation, and A. L. Humphrey, general manager of the air brake company, was elected president of the merged concerns. The stockholders of the air brake company will meet March 15 to ratify the action of the company's directors.

Directors of National Carbon Company of New Jersey have decided that it will be for the best interests of the stockholders to take steps looking to the acquisition of the property and assets of the New Jersey Corporation and other properties by a new corporation to be organized under the laws of New York. There will be organized a New York corporation known as National Carbon Company, Inc., having an authorized capital stock consisting of 1,056,000 shares, of which 56,000 shares, of the par value of $100 each, are to be preferred stock, and 1,000,000 shares without nominal or par value are to be common stock. The preferred stock will draw cumulative eight-per-cent dividends, payable quarterly on the first days of February, May, August and November, and will be redeemable at $140 per share. Every holder of any of the seven-per-cent cumulative preferred stock of the New Jersey corporation will be given an opportunity to exchange the same for a like amount, share for share, of the eight-per-cent cumulative preferred stock of the New York corporation, and every holder of any of the common stock of the New Jersey corporation will be given an opportunity to exchange the same for common stock of the New York corporation on the basis of one share of the common stock of the New Jersey corporation for four shares of the common stock of the New York corporation.

Dividends.

	Term.	Rate.	Payable.
Assoc. Gas & Elec., pf.	Q	1.5 %	Jan. 15
Col. Ry., Pw. & Lt.	Q	1.25%	Feb. 1
Col. Ry., Pw. & Lt., pf., B	Q	1.25%	Feb. 1
East St. L. & Sub., pf.	Q	0.75%	Feb. 1
Ed. Elec. Ill., Boston	Q	3 %	Feb. 1
Elec. Bond & Share	Q	2 %	Jan. 15
Elec. Bond & Share, pf.	Q	1.05%	Feb. 1
Ft. Worth Pw. & Lt., pf.	Q	1.75%	Feb. 1
Ill. Co. Util., pf.	Q	1.5 %	Feb. 1
Mil. Elec. Ry. & Lt., pf.	Q	1.5 %	Jan. 31
Pub. Serv. No. Ill., pf.	Q	1.5 %	Feb. 1

Reports of Earnings.

BELL TELEPHONE SYSTEM.

November:	1916	1915
Total operating revenue	$23,305,003	$20,086,303
Operating expenses	15.325,871	13.310,164
Net operating revenues	7,979,132	6,776,139
Net after taxes	6,445,434	5,534,720
Eleven months:		
Total operating revenue	240,836,856	213,824,643
Operating expenses	159,198,088	142.103.883
Net operating revenue	81,638,768	71,720,760
Net after taxes	66,684.576	58.309,946
Miles wire owned	19,637,485	18,290,009
Bell stations owned	6,480,832	5,922.657
Total stations	9,782,803	9,074,930

NORTHERN STATES POWER.

Consolidated income account of the Northern States Power Company, as reported to the New York Stock Exchange for year ended September 30, 1916, compares as follows:

	1916	1916
Gross earnings	$ 5,822,703	$ 4,933,575
Expenses and taxes	2,588,746	2,201,105
Net earnings	3,233,956	2,732,470
Bond and note interest	1,670,099	1,563,046
Preferred dividend	674,449	587,489
Commond dividend	179,251	----------
Balance for depreciation, etc.	779,860	635,875

Proposals

ELECTRIC ELEVATORS.—Bids will be received February 5 for three electric elevators for public use, two for jail use, three for private use, two dumb waiters and two sidewalk lifts, for the court house and jail at Sioux City, Iowa, to cost $100,000. Address Architect W. L. Steele, United Bank Building, Sioux City.

GENERATING EQUIPMENT.—Bids will be received until January 24 by W. R. Canaan, City Clerk, Anthony, Kans., for bids on one 150-kilowatt and one 75-kilowatt steam-engine-driven direct-connected generators. Specifications may be obtained from Black & Veatch, consulting engineers, Kansas City, Mo., or at the office of the City Clerk.

TELEPHONE AND SIGNAL CABLE.—Bids will be received at the office of the Commissioners of the District of Columbia, 509 District Building, Washington, D. C., until January 22, for furnishing telephone and signal cables. Specifications and form of proposal will be furnished upon application to the purchasing officer, 320 District Building. Oliver P. Newman, Commissioner.

CONDUIT, WIRING AND LIGHTING FIXTURES.—Sealed proposals will be received until January 31 at the Supervising Architect's office, Treasury Department, Washington, D. C., for changes in plumbing, conduit, wiring and lighting fixtures in the postoffice, court house, etc., in Troy, N. Y., in accordance with drawings and specifications, copies of which may be had at that office or the office of the Custodian, Troy, N. Y. James A. Wetmore, Acting Supervising Architect.

ELECTRICAL SUPPLIES.—Bids will be received at the Bureau of Supplies and Accounts, United States Navy Department, Washington, D. C., for furnishing supplies at the following naval stations: Schedule 611, Brooklyn, N. Y., 25,000 feet of telephone cable, 120,000 feet of twin-conductor wire, and 200 fire-control telephones. Schedule 617, Mare Island, Cal., 18 electric flatirons, 18 portable ventilating sets, and miscellaneous switches, bushings and fittings. Bidders desiring to submit proposals should make application to the Bureau or to the nearest navy yard purchasing office.

ELECTRICAL INSTALLATION.—Sealed bids will be received by the Board of Administration, Springfield, Ill., January 22, for the following improvements at institutions named: Installation of a complete switchboard and wiring in power house at the Alton State Hospital. Installation of an overhead electric transmission line at the Watertown State Hospital, East Moline, Ill. Plans and specifications for the above named improvements may be obtained upon application to James B. Dibelka, state architect, 130 North Fifth Avenue, Chicago, Ill., and by depositing a certified check for ten dollars payable to the state architect. Address Frank D. Whipp, fiscal supervisor, Springfield, Ill.

Incorporations

TOLEDO, O.—The Toledo Electric Sales Company has increased its capital stock from $25,000 to $50,000.

COLUMBIA, TENN.—The Columbia Light & Power Company has increased its capital stock to $100,000.

ST. LOUIS, MO.—Emerson Electric Manufacturing Company has increased its capital stock from $600,000 to $800,000.

FLASHER, N. D.—Slope Electric Company. Capital, $50,000. Incorporators: A. C. Westphal, of Flasher; J. G. Bunting and Otto Kemmerset, of Mandan.

VANCOUVER, WASH. — The Standard Electric Power & Chemfcal Company. Capital, $4,000,000. Incorporators: D. F. Smith, C. D. Charles and John A. Jeffrey.

NEW YORK, N. Y.—D. & S. Storage Battery Company. Capital, $50,000. Incorporators: B. F. Senet, 3875 Broadway, New York City; Ernest Kendall and Joseph Reid.

ST. LOUIS, MO. — Cleveland Battery Manufacturing Company. Capital, $5,000. To manufacture and deal in electric batteries. Incorporators: Julius Shaftel and John K. Sterling.

WALLINGTON, N. J.—The American Jobbers Supply Company. Capital, $50,000. To manufacture electrical appliances. Incorporators: William M. Carpenter, M. L. Joslyn and Albert G. Jarmin.

CLEVELAND, TENN.—Jay Light Company. Capital, $25,000. To manufacture machinery for electric lighting. Incorporators: S. N. Varnell, A. M. Bryant, B. E. Covington and G. R. Berger.

WILMINGTON, DEL.—World's Cheapest Power Company of America. Capital, $500,000. To operate water-power plants. Incorporators: Harry Ebert, August Muer and Henry Muer, Frederick, Md.

DOVER, DEL.—General Scientific Equipment Company. Capital, $75,000. To manufacture scientific apparatus. Incorporators: Alfred J. Zimmerman, A. J. Leonard and Maurice Kline, Philadelphia, Pa.

DOVER, DEL.—American Burner Company. Capital, $100,000. To manufacture burners and fuel-saving devices. Incorporators: F. D. Buck, George W. Dillman and M. L. Horty, Wilmington, Del.

DOVER, DEL.—The Electric Manufacturing Company. Capital, $250,000. To manufacture electric devices for cleaning, polishing, etc. Incorporators: W. F. O'Keefe, George G. Stiegler and E. E. Wright, Wilmington, Del.

AUGUSTA, ME.—Northwest Power Company. Capital, $500,000. To control, equip, deal in and operate all public work conveniences. Incorporators: L. J. Coleman, C. L. Andrews, M. F. Hearin, E. B. Turner and E. M. Leavitt.

Electrical Patents Issued January 9, 1917

Prepared by Thomas Howe, Patent Attorney, 2 Rector Street, New York, N. Y.

1,211,388. Protected Electrode and Process of Making the Same. E. H. Becker, assignor to Kinetic Electric Co., Norfolk, Va. Negative electrode for galvanic cells.

1,211,434. Telephone-Exchange System. C. L. Goodrum, assignor to Western Electric Co., New York, N. Y. Automatic system.

1,211,435. Telephone System. E. A. Graham, Brockley, London, England. Has receiver and transmitter at companion stations and connections for supplying current thereto.

1,211,440. Electric Switch. J. H. Hall, assignor to Electric Controller & Mfg. Co., Cleveland, O. Electromagnetically operated; does not operate when the current is excessive.

1,211,443. Electric Insulation. J. A. Heany, assignor to Patents Experiment Corp., New York, N. Y. A tape-like sliver of fibers has reinforcing thread cemented to one side.

1,211,448. Time and Burglar Alarm. W. G. Hubbs, Walnut Ridge, Ark. Structure of blade switch.

1,211,465. Flashlight. J. J. McGuckin, Brooklyn, N. Y. Has exterior that is noncylindrical to prevent rolling.

1,211,491. Recording Apparatus. M. Seidler, assignor to Hartmann & Braun, A. G., Frankfort-on-the-Main, Germany. For recording characteristics of a plurality of electric circuits.

1,211,492. Electric Belt. V. Sence, New York, N. Y. Therapeutic device.

1,211,507. Magneto Attachment. H. R. Van Deventer, assignor to Splitdorf Electrical Co., Newark, N. J. For ignition generators.

1,211,534. Telephone Signal Device. U. M. Boyd, Dallas, Tex. Operated by switch hook of instrument.

1,211,545. Manufacture of Steel. G. J. Chetwynd, West Riding, England. Manner of purifying the metal after being normally finished which comprises passing current through the molten material.

1,211,606. Electrically Heated Radiator. J. D. McDonald, assignor to McDonald Hydro-Electro Heating Co., Sudbury, Canada. Electric heater in base heats water partially filling radiator.

1,211,607. Telephone Apparatus. M. K. McGrath, assignor to Western Electric Co., New York, N. Y. Special structure of desk set comprising signal transmitter.

1,211,612. Switching Device for Telephone Systems. D. D. Miller, assignor to Western Electric Co. Structural details of an electromagnet.

1,211,617. Dynamo-Electric Machine. A. H. Neuland, assignor to Neuland Electrical Co., San Francisco, Cal. Inductor type.

1,211,623. Electrically Operated Piano-Player. W. C. Reed, assignor to the Telelectric Co., Pittsfield, Mass. Arrangement of player and controller magnets.

1,211,628. Electric Switch. J. Sachs, Hartford, Conn. Details of fused switch blade.

1,211,629. Electric Switching and Meter-Testing System. J. Sachs. Structure of base-block units.

1,211,644. Automatic Alarm System. B. Ulferts, Lakefield, Minn. Structure of rail contacting device carried by locomotive.

1,211,651. Lighting Fixture. E. C. White, assignor to Duplex Lighting System, Chicago, Ill. Reflector structure with primary and secondary reflectors. (See cut.)

1,211,675. Railway Signal. E. R. Coe, assignor to Union Switch & Signal Co., Swissvale, Pa. Biased signal is connected with operating motor by electromagnetically controlled clutch.

1,211,676. Signal. J. P. Coleman, Edgewood Borough, Pa., assignor to Position-Light Signal Co. Arrangement of adjustable lamp-supporting brackets and arms.

1,211,687. Apparatus for the Electrolytic Decomposition of Water. A. Dohmen, Cologne, Germany. A series of cells of the filter-press type.

1,211,688. Telephone System. F. W. Dunbar, assignor to Kellogg Switchboard & Supply Co., Chicago, Ill. Has automatic connection of subscribers' lines with manual trunks.

1,211,689. Telephone Exchange System. F. W. Dunbar, assignor to Kellogg Switchboard & Supply Co. Motor-operated selecting mechanism connects answering ends of link circuits with calling lines.

1,211,694. Rectifier. J. M. Fitzgerald, assignor to H. S. Hawley, Chicago, Ill., Merchants Loan & Trust Co., executor of said Hawley, deceased. Commutator device.

1,211,697. Safety Block Signal. G. W. Gerlach, Cumberland, Iowa. Structure of motor-driven signal-operating mechanism.

1,211,720. Automatic Train-Stopping Device. G. Landreth, assignor of ⅝ to F. M. Lutschg, ⅛ to H. B. Bagley, ⅛ to O. J. Dyckman, ⅛ to W. G. Dyckman, ⅛ to D. McKelvey, ⅛ to A. T. Hammerschmidt, and ⅛ to H. R. Dyckman, Fullerton, Cal. Mounted on car and controlling the air-brake system.

1,211,724. Lamp Shade or Globe Holder. A. Little, Pittsburgh, Pa. Structural details.

1,211,750. Lamp. W. C. Paul, assignor to Reflex Co., Newark, N. J. Non-glaring vehicle lamp.

1,211,752. Electric Controlling Mechanism. O. H. Pieper and A. F. Pieper, Rochester, N. Y. Door of transformer casing controls connections of high and low-potential conductors.

1,211,759. Illuminable Pad Holder. T. Robins, assignor to Supremus Mfg. Co., New York, N. Y. Has a flashlight.

1,211,768. Electromagnetic Vibrator. W. E. Schwarzmann and C. M. Wild, assignors to Bosch Magneto Co., New York, N. Y. Structural details of device for ignition purposes.

1,211,770. Micromagnetic Detector. F. G. Simpson, Seattle, Wash. For wireless systems.

1,211,771. Boudoir Lamp. H. Singer, New York, N. Y. Standing lamp comprises doll with lamp shaded by skirt.

1,211,772. Lamp Shade. F. C. Smith, assignor to Waterbury Mfg. Co., Waterbury, Conn. Manner of securing supporting wire to shell.

1,211,778. Circuit-Breaker. H. A. Steen, assignor to Allis-Chalmers Mfg. Co., Milwaukee, Wis. Explosion of fuse in switch arm blows it open. (See cut.)

1,211,788. Railway Traffic-Controlling Apparatus. J. D. Taylor, assignor to Union Switch & Signal Co., Swissvale, Pa. Track-switch-operating mechanism and signal.

1,211,790. Telephone or Other Booth. H. E. Van Orden, assignor of ½ to J. W. Sinnott, Brooklyn, N. Y. Knock-down structure.

1,211,802. System of Electrical Distribution. J. L. Woodbridge, Philadelphia, Pa. A storage-battery circuit is supplied by motor-generator set having high-voltage motor and low-voltage generator, the dynamo voltage being automatically regulated by regulating the motor field.

1,211,803. Voltage Regulation. J. L. Woodbridge. Constant-voltage regulation of generator in battery system by regulating field of dynamo by Wheatstone bridge arrangement comprising resistances of opposite voltage characteristics.

1,211,822. Lightning Arrester. A. Chernyshoff, assignor to Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. Arrangement of inductances and condensers.

1,211,847. Electric Light Fitting or Bracket. E. R. Hough and L. Harrison, London, England. Structural details.

1,211,863. Apparatus for and Method of Producing High-Frequency Currents of Electricity. D. G. McCaa, Lancaster, Pa. For wireless systems.

1,211,889. Egg Tester. F. F. Stone, Buffalo, N. Y. Arrangement of lamp and casing.

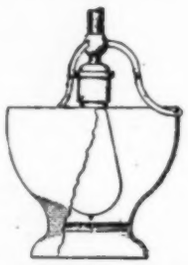
1,211,935. Means for Heating Cylinders of Explosive Engines. J. H. Groshans, Baltimore, Md. Electric heaters are mounted at the ends of the cylinders.

1,211,940. Plugging-in Switch. W. S. Harlow, Swampscott, Mass. Structural details.

1,211,943. Electrical Resistance Material. M. A. Hunter, Troy, N. Y. Comprises iron, a metal having the properties of nickel and cobalt, and a metal of the chromium group.

1,211,963. Radio Receiving Apparatus. J. A. Proctor, assignor to Wireless Specialty Apparatus Co., Boston, Mass. Structure of a receiver of continuous oscillations.

1,211,967. Overload Circuit-Breaking Apparatus. E. O. Schweitzer, Chicago, Ill. Comprises a fuse and a magnetically tripped blade.



No. 1,211,651.—Reflector Arrangement.

1,211,973. Electric Heater. V. Slater and L. D. West, assignors to Electro-Fume Co., Denver, Colo. Air heater and circulator.

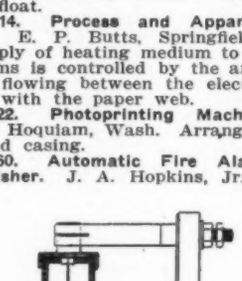
1,211,976. Novelty Device. J. R. Spencer and J. L. Ross, Bartow, Fla. Battery-lighted scarf pin.

1,211,989. Sunken-Ship Indicator. H. Westin, Smithville, Minn. Electrically-lighted float.

1,212,014. Process and Apparatus for Drying. E. P. Butts, Springfield, Mass. The supply of heating medium to the drying drums is controlled by the amount of current flowing between the electrodes in contact with the paper web.

1,212,022. Photoprinting Machine. G. Croston, Hoquiam, Wash. Arrangement of lamp and casing.

1,212,060. Automatic Fire Alarm and Extinguisher. J. A. Hopkins, Jr., Burns, Kans. An extinguisher and alarm circuit contact are controlled by a fusible plug.



No. 1,211,778.—Circuit-Breaker.

1,212,062. Process for the Production of Cuprious Oxid Electrolytically. B. Hunt, Glasgow, Scotland. Cuprous oxid produced by electrolysis of copper in an electrolyte of sodium chlorid.

1,212,069. Sign. J. F. Kaiser, Bartlesville, Okla. Comprises lamps of different colors having their brilliancy varied.

1,212,072. System for Firing Explosives in Mines. C. E. Knowles and L. D. Cornelius, Pittsburgh, Kans. Circuits of electric squibbs are controlled by fluid pressure.

1,212,082. Electrically Heated Sadiron. E. V. Manzella, Chicago, Ill. Structural details.

1,212,091. Telephone Attachment. J. O. Moisson, Charleston, S. C. A signal circuit closed by the rising of the switch hook may be opened by the push button on the receiver.

1,212,115. Illumination Controller. G. H. Scherff, assignor to G. H. Scherff & Co., Brooklyn, N. Y. An arc-like motion-picture projector.

1,212,125. Switch for Heavy Alternating Currents. W. Burstyn, Berlin, Germany. Takes advantage of the quenching effect produced by the passage of current through zero.

1,212,129. Lightning Arrestor. A. Chernyshoff, assignor to Westinghouse Electric & Mfg. Co. Arrangement of series transformers having secondary circuits for absorbing the energy of abnormal disturbances.

1,212,145. Headlight Lamp. C. G. Mollan, Chicago, Ill. Lamp is shielded and in front of a lusterless light diffuser.

1,212,146. Circuit-Breaker. J. J. Nielsen, Chicago, Ill. Has hot-wire-controlled electromagnetic trip.

1,212,157. Train-Controlling Device. T. W. Scott, assignor to American Train Control Co., Baltimore, Md. Comprises caution signal and stop mechanism.

1,212,161. Switch. F. E. Getts, assignor to Electrical Engineers Equipment Co., Chicago, Ill. Details of knife-blade structure.

1,212,163. Relay for Undulatory Currents. E. M. C. Tigerstedt, Copenhagen, Denmark. Special arrangement of anodes and cathodes in evacuated chamber.

Reissue 14,243. Thermo-Electric Couple. W. H. Bristol, assignor to Bristol Co., Waterbury, Conn. Is separable between its hot and cold end at a point unaffected by temperature variations; facilitates mounting for temperature measurement.

Reissue 14,245. Process and Apparatus for Making Brazed Joints. F. W. Heuser, Gross-Lichterfelde, Berlin, Germany. Arc process.

PATENTS EXPIRED.

The following United States electrical patents expired on January 16, 1917:

641,257. Electrical Controlling Device. H. P. Ball, New York, N. Y.

641,264. Contact Box for Electric Tramways. E. Bonnet, J. Paufique and Geo. Liniere, Lyons, France.

641,275. Motorman's Recorder. J. R. Cravath, Chicago, Ill.

641,276. Porous Diaphragm for Cells Employing Fused Electrolytes. J. D. Darling, Philadelphia, Pa.

641,290. Pressure-Regulating Apparatus for Mains. J. S. Highfield, St. Helens, England.

641,306. Electric Water Heater. A. W. Lawton, New York, N. Y.

641,309. Coin-Controlled Electric Battery. A. Linick, Chicago, Ill.

641,322. Method of Regulating Electric Circuits. Mathias Pfatischer, Philadelphia, Pa.

641,360. Electric Amalgamator. L. H. Barricks, San Francisco, Cal.

641,371. Trolley Arrester. W. E. Carlile, New York, N. Y.

641,373. Telephone Switchboard. F. B. Cook, Chicago, Ill.

641,374. Combined Terminal Head and Junction Box. F. B. Cook, Chicago, Ill.

641,382. Electric Lock. Levi Goughenour and C. B. McCabe, Braddock, Pa.

641,383. Trolley Catcher. H. W. Graham, Louisville, Ky.

641,400. Connection Counter for Telephone Lines. F. R. McBerty, Downer's Grove, Ill.

641,412. System of Electric Circuits and Brakes for Vehicles. E. A. Sperry, Cleveland, O.

641,425. Microphone. J. O. Zwarg, Frieberg, Germany.

641,438. Electrolytic Apparatus. J. D. Darling, Philadelphia, Pa.

641,452. Means for Controlling Electric Motors. R. M. Hunter, Philadelphia, Pa.

641,453. Method of Controlling Electric Motors. R. M. Hunter, Philadelphia, Pa.

641,463. Portable Electric Lamp. H. J. Muller, New York, N. Y.

641,484. Apparatus for Measuring Velocity of Sound-Waves. W. Wolff, Charlottenburg, Germany.

641,514. Motor Vehicle. C. W. Hunt, New York, N. Y.

641,538. Electromagnetic Apparatus. Francisco de Borja Pavon, Caibarien, Cuba.

641,552. Process of Agglomerating Comminuted Ores or Concentrates. M. Ruthenburg, Philadelphia, Pa.

641,569. Telephone Apparatus. D. H. Wilson, Chicago, Ill.

641,570. Telephone. D. H. Wilson, Chicago, Ill.

641,603. Electrically Propelled Vehicle. F. J. Newman and J. Ledwinka, Chicago, Ill.

641,607. Electricity Meter. P. Rissler and H. Bauer, Freudenstadt, Germany.

641,613. Shade for Electric Lights. W. D. Smith, Prophetstown, Ill.